Kodak | Dental Systems

KODAK 2100 Intraoral X-ray System

Installation & Service Manual

This document was originally written in English
Revision date: 02/2006

CE 0459

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Eastman Kodak Company, 2006

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SECTION 1

SAFETY AND REGULATORY INFORMATION

The information contained herein is based on the experience and knowledge relating to the subject matter gained by Eastman Kodak Company prior to publication. No patent license is granted by this information.

Eastman Kodak Company reserves the right to change this information without notice, and makes no warranty, express or implied, with respect to this information. Kodak shall not be liable for any loss or damage, including consequential or special damages, resulting from any use of this information, even if loss or damage is caused by Kodak's negligence or other fault.

1 - Conventions Used in This Manual

CAUTION
Caution points out procedures that you must follow precisely to avoid damage to the system or any of its components, yourself or others, loss of data, or corruption of files in software applications.

NOTE
Notes provide additional information, such as expanded explanations, hints, or reminders.

IMPORTANT
Important highlights critical policy information that affects how you use this manual and this product.

2 - General Safety Guidelines

- Ceiling-mounted unit
- Mounting on mobile stand
- This product is designed and manufactured to ensure maximum safety of operation. Operate and maintain it in strict compliance with the safety precautions and operating instructions contained in this manual.
- This product meets all the safety requirements applicable to medical equipment. However, anyone attempting to operate the system must be fully aware of potential safety hazards.
- There are no user serviceable parts in this system. The product must be installed, maintained, and serviced by qualified service personnel according to the procedures and preventive maintenance schedules in the product service manual. If your product does not operate as expected, contact your Service Representative.
- Do not modify this product in whole or in part without prior written approval from Eastman Kodak Company.
- The assembly, extensions, adjustments, modifications, and repairs must be performed by an authorized Service Representative. Your radiology system must be installed in premises that comply with IEC provisions and applicable standards.
- Personnel operating and maintaining this system should receive training and be familiar with all aspects of operation and maintenance.
- To ensure safety, read all user manuals carefully before using the system and observe all Caution, Important, and Note callouts located throughout the manual.

- Keep this manual with the equipment.
- Reading this manual does not qualify you to operate, test, or calibrate this system.
- Unauthorized personnel are not allowed access to the system.
- If the product does not operate properly or fails to respond to the controls as described in this manual:
  - Follow the safety precautions as specified in this manual.
  - Stop using the equipment and do not make or authorize any changes to it.
  - Immediately contact your Service Representative, report the problem, and await further instructions.
- X-ray systems manufactured by Eastman Kodak Company comply with safety standards throughout the world for optimum protection against radiation risks.
- Be aware of the product specifications and of system accuracy and stability limitations. Consider these limitations before making any decision based on quantitative values. If you have any doubts, consult your Sales Representative.

CAUTION
X-rays can be dangerous if used incorrectly. Take precautions even when following the instructions in this manual.

Use conventional, commercially available equipment to protect yourself and your patients against the risk of scattered radiation.

- If you fail to comply with these instructions, Eastman Kodak Company will not be responsible for the safety reliability or characteristics of the equipment.

3 - Warnings and Safety Instructions

CAUTION
Do not operate the equipment in the presence of explosive liquids, vapors, or gases. Do not plug in or turn on the system if hazardous substances are detected in the environment. If these substances are detected after the system has been turned on, do not attempt to turn off the unit or unplug it. Evacuate and ventilate the area before turning off the system.

DANGER: THIS IS AN ELECTRICAL UNIT. DO NOT EXPOSE IT TO WATER SPRAY. SUCH ACTION MAY CAUSE AN ELECTRICAL SHOCK OR A MALFUNCTION OF THE UNIT.

WARNING

The user is responsible for the operation and maintenance of this unit.

This unit must be operated only by legally qualified persons.

The cover of the unit must not be opened by the operator.

Inspection and maintenance operations should be carried out only by an approved Kodak Dental Systems technician.

WARNING

This unit must be installed in an x-ray room that complies with current installation standards. From this location, visual or audio communication must be maintained with the patient, together with access to the control interface during exposure.

WARNING

Do not operate the unit if there is the threat of an earthquake.

Following an earthquake, ensure that the unit is operating properly before using it again.

Failure to observe this precaution may expose patients to hazards.

WARNING

X-ray equipment can be hazardous to patients and the operator if the exposure safety factors and operating instructions are not observed.

WARNING

Do not place objects within the field of operation of the unit.

WARNING

We recommend that the patient and the operator wear protective lead-lined aprons, unless other Radiation Protection Protocols apply locally.

Ensure that any parts of the unit that may come into contact with the patient and the operator have been disinfected after each patient has been exposed to x-rays.

If the unit develops a fault, turn it off (O) and display a sign that states “Out of Service.”

WARNING

The operator must ask the patient to refrain from moving during the entire period of exposure.

In the European Union, this symbol indicates that when the last user wishes to discard this product, it must be sent to an appropriate facility for recovery and recycling.

Contact your local Kodak representative or refer to www.kodak.com/go/recycle for additional information on the collection and recovery programs available for this product.

4 - Labeling Summary

Safety Labels

HIGH VOLTAGE

CHASSIS GROUND STUD

ATTENTION: CONSULT ACCOMPANYING DOCUMENTS

CAUTION: IONIZING RADIATION

5 - IEC Symbols Used

The system may have labels with one or more of the following symbols. These symbols indicate the IEC standards to which the system conforms.

Caution — consult accompanying documents

Protective earth

Power ON

Power OFF

Caution — Electrical shock hazard

6 - Regulatory Information

The product conforms to the following safety standards: IEC 601-1 Medical Electrical Equipment General Requirements for Safety, EN60601-1-2 Medical Electrical Equipment Electro-Magnetic Compatibility Requirements and Tests, IEC 60825-1 Safety of Laser Products.

CE Conformity

This product conforms to the requirements of EU Council Directive 93/42/EEC. The Kodak 2100 Intraoral X-ray System is a Class 1 medical device, which bears the following mark of conformity: CE 0123.

This system has received FDA clearance for sale in the USA.

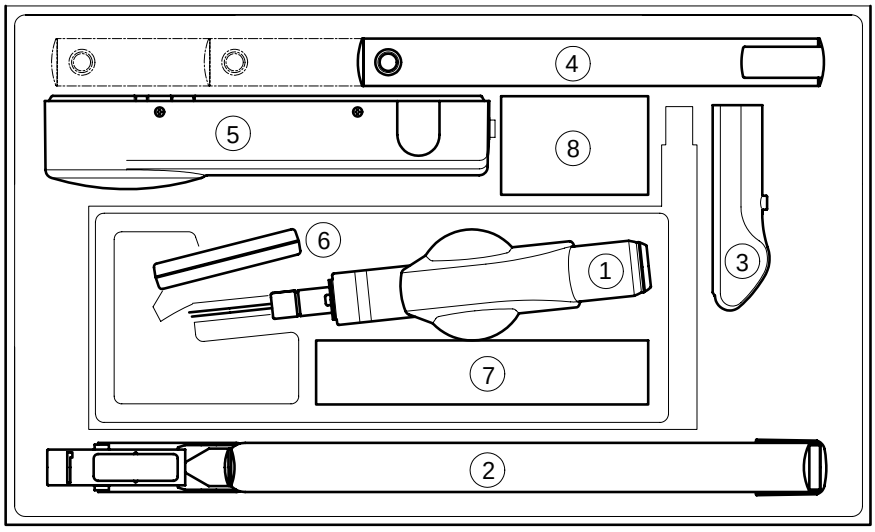
U.S. Regulations

CAUTION
U.S. federal law restricts this device to sale by or on the order of a dentist.

SECTION 2

SYSTEM OVERVIEW

1 - Packaging

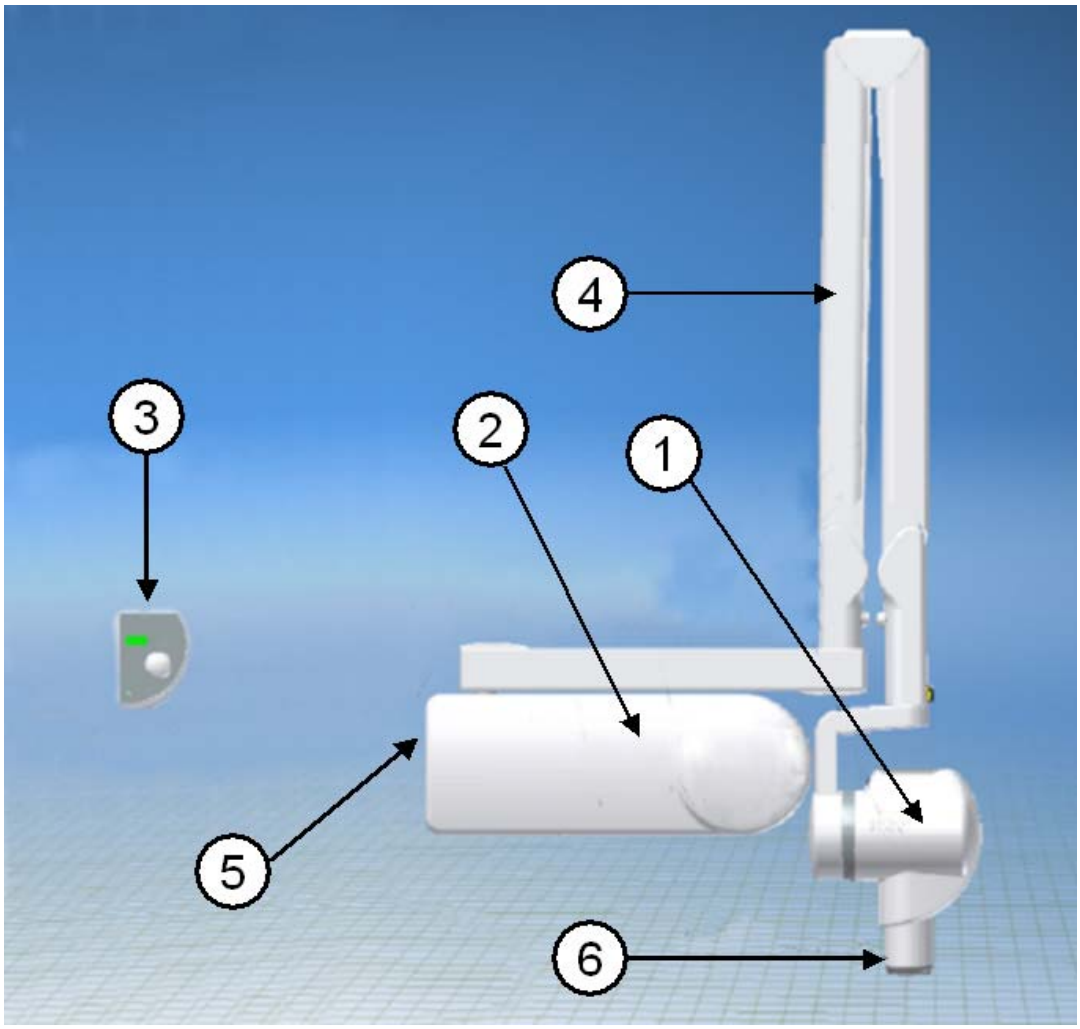


Box dimensions (L x W x H):
1 000 x 600 x 300 mm (39-3/8 x 23-5/8 x 11-13/16 in.)

The Kodak 2100 unit is composed of the following components arranged in special expanded polystyrene packing to guarantee complete protection during transport, as shown in the diagram above.

N°	DESCRIPTION
1	Complete generator
2	Scissor arm with generator cable
3	Plastic covers for the scissor arm
4	Extension arm length: 470 mm (18-1/2 in.), 648 mm (25-1/2 in.) or 825 mm (32-1/2 in.) as specified in the order
5	Wall framework
6	Control timer
7	Power board
8	Accessories: brake for pivot, brake for arm…
-	Technical documentation

2 - Components



Your intraoral x-ray system unit is composed of:

① A high frequency x-ray generator comprising:

➢ a transformer and associated electronics, and an oil-bathed x-ray emitting tube

➢ a beam limiting device ⑥ that limits radiation to a diameter of approximately 6 cm (2-3/8 in.) on the skin and ensures a distance of 20 cm (7 7/8 in.) between the skin and the x-ray tube focal spot

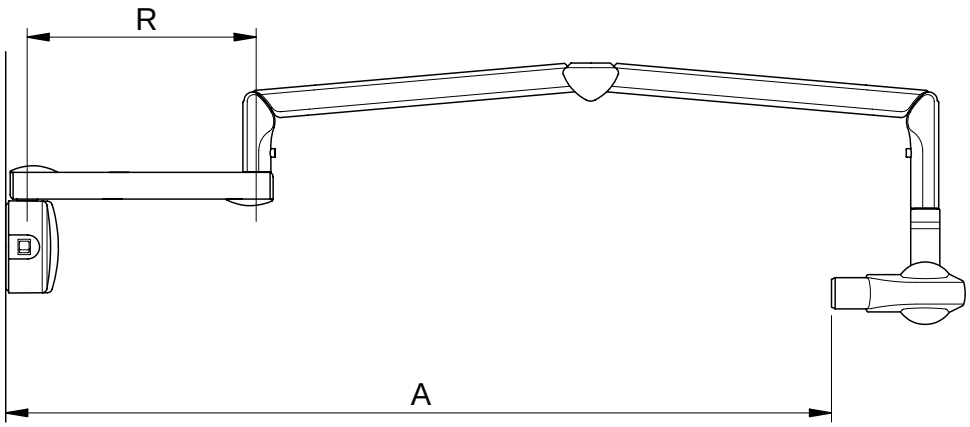
➢ a handle to facilitate positioning.

② A wall framework containing the high frequency generator's control electronics designed to support its mechanical stand.

③ A timer / control unit for the x-ray generator, with the following features:

- selection of exposure time
- a self-test of the microprocessor each time the unit is activated
- an alarm in the event of incorrect operation
- a digital icon that automatically adjusts the exposure time range (reduction of the time range) if you are using an RVG.

④ A scissor arm:
The scissor arm makes it possible to position the generator easily and precisely. It is wall-mounted with an extension of 470 mm (18-1/2 in.), 648 mm (25-1/2 in.) or 825 mm (32-1/2 in.).



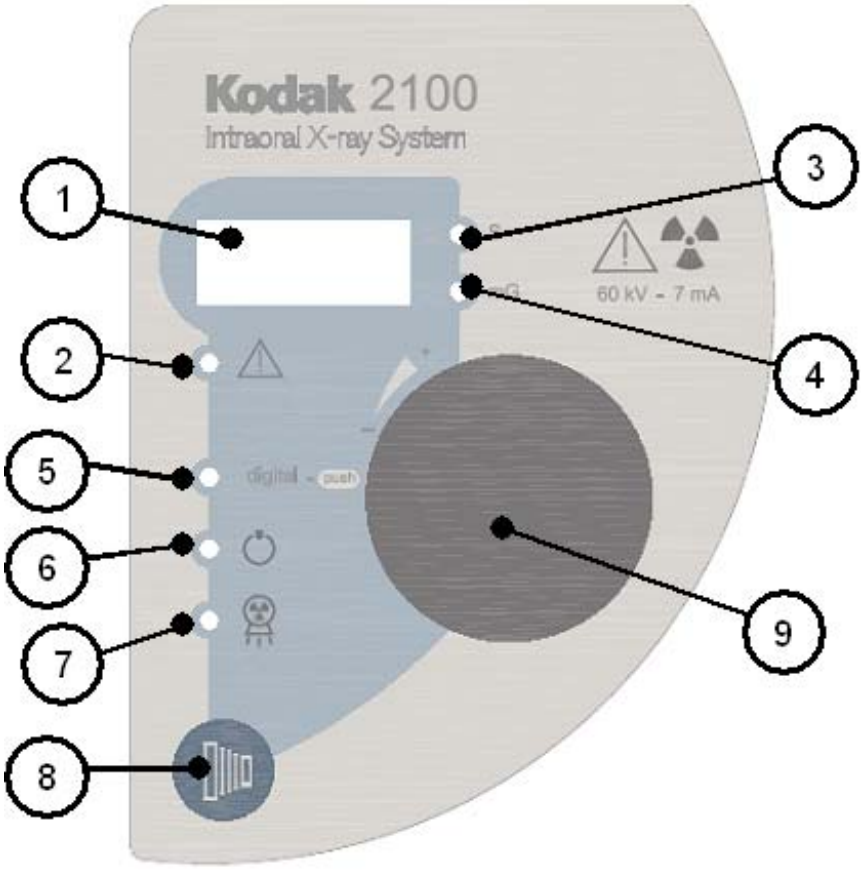
EXTENSION	R		SPAN A	
CG645	470 mm	(18-1/2 in.)	1 700 mm	(66-15/16 in.)
CG646	648 mm	(25-1/2 in.)	1 880 mm	(74 in.)
CG648	825 mm	(32-1/2 in.)	2 050 mm	(80-11/16 in.)

⑤ On/off switch with built-in light.

Options

- Rectangular collimator ⑥ of different sizes adapted to films and RVG sensors
- An additional beam limiting device measuring 10 cm (4 inches) that limits radiation to a diameter of approximately 6 cm (2-3/8 in.) on the skin
- Separate exposure switch if the control panel is mounted on the cover of the wall framework
- Ceiling-mounted unit
- Mounting on mobile stand
- Floor-mounted unit.

3 - Control Timer Unit



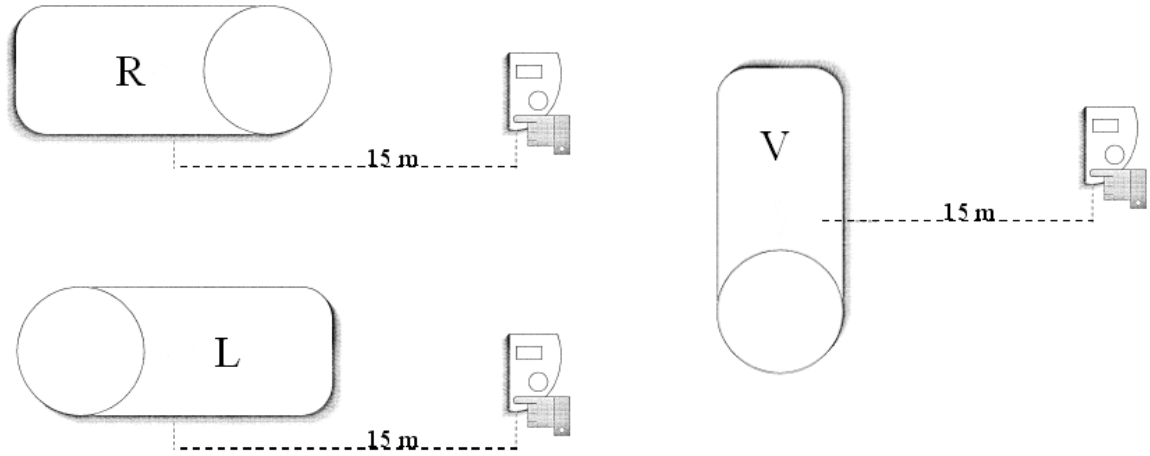
1 Display
2 “Warning, see accompanying documents” sign
3 Exposure time selection
4 Emitting dose calculation
5 Digital mode function
6 Ready mode
7 X-ray emission control light
8 X-ray exposure button
9 Selection knob:
   a. Exposure time selection by rotating the knob
   b. Display of the latest dose emitted by quickly pressing the knob
   c. Switch from film to digital exposure time frame by pressing and holding the knob

SECTION 3

INSTALLATION LAYOUTS

1 - Wall Framework Layouts

There are 3 different ways to position the wall framework: Right, Left or Vertical position. These 3 different layouts can apply to the standard mounting with the separate timer (as shown below), or with the 2 optional configurations. Framework and control timer must be separated by 15 meters (16.4 yards) maximum.

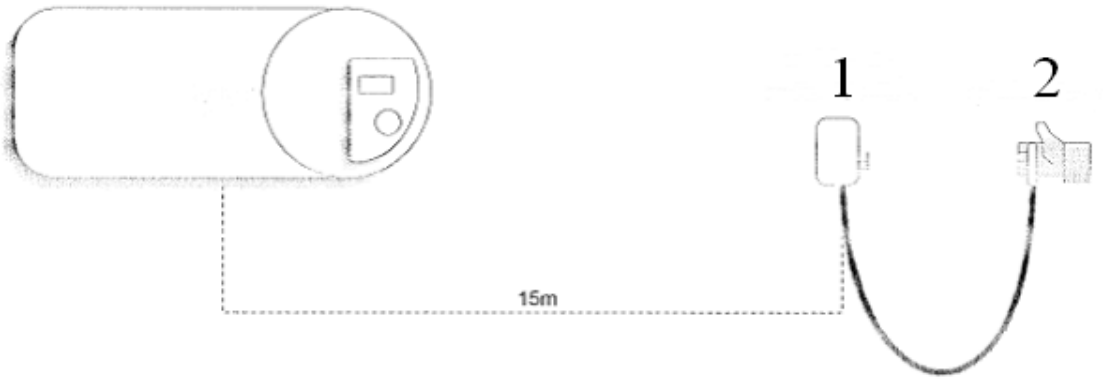


2 - Optional Configurations

CAUTION
The exposure switch has to be ordered separately. It does not come with the standard kit.

2-1 - Separate exposure switch

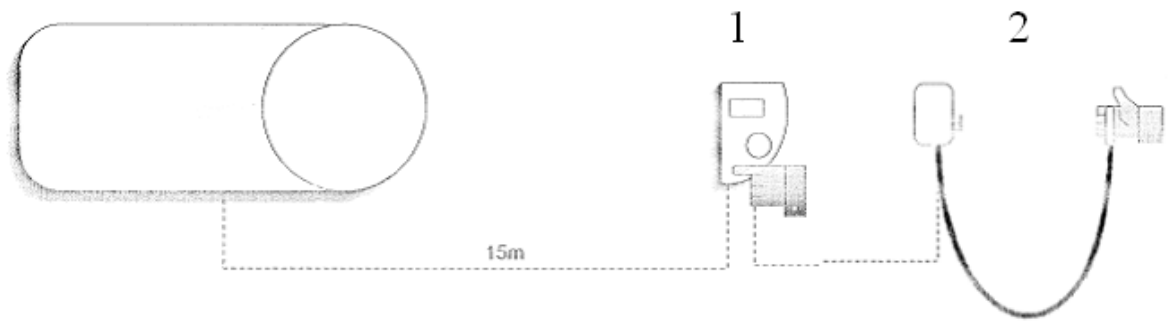
In this configuration, the timer is mounted on the wall framework.



1 - connection box

2 - exposure switch

2.2 - Dual-command exposure switches (U.S.)



1 - timer = 1st button

2 - switch = 2nd button

SECTION 4

CHECKING THE PREMISES BEFORE INSTALLATION

1 - Equipment and Tools Needed for Installation (Not Supplied)

- 1 Multimeter with range 300 V ~ 1% and 30 V= 1%, internal resistance greater than 100 kΩ, equipped with 2 measurement wire grips
- 1 Tape measure
- 1 7 mm socket wrench
- 1 Set of metric Allen keys
- 1 TorX key reference # 10
- 1 Spirit level
- 1 Plastic mallet
- 1 Impact drill with a set of drill bits from 3 to 13 mm (.12 to .51 in.) suitable for the material of the wall
- 1 Small screwdriver (3 mm) (.12 in.) for electrical connections
- 1 Medium screwdriver
- Some plastic clamps for attaching cables
- Three-wire power supply cable (2 conductors + ground). Recommended cross-section 2.5 mm^2 (14 AWG), length not exceeding 12 meters (13 yd.) in 100-130 V and 24 meters (26 yd.) in 230-240 V. For greater lengths, use a cable with a bigger cross-section corresponding to regulations in force in the country concerned.
- Shielded cable 2 x 0.22 mm^2 (2 x 24 AWG) for the separate exposure switch (optional).

To mount the wall framework, use mounting tools suitable for the type of wall concerned (see “Required Mechanical Specifications” below).

2 - Required Mechanical Specifications

WARNING
The Kodak 2100 unit must be installed so that it is impossible to rotate the scissor arm through 360°.
Otherwise, the arm power supply cable can fail and cause electrical damage.

The wall framework which carries the x-ray unit must be strongly attached to the wall. Choose an attachment system suitable for the type of wall and capable of withstanding a tear-off force of ***147 kg (324 lbs)*** per anchor point.

Check that the wall is flat and level to avoid any drift in the arm position. Use spacers if the wall surface is not level.

3 - Required Electrical Specifications

A dedicated three-wire electrical line protected by a 16 A breaker (D curve) and a RCCB of 30 mA from the electrical panel must be provided.

A power supply line generally consists of a three-wire cable (2 conductors + ground). The minimum cross-section is 2.5 mm^2 (14 AWG) and the wire colors and characteristics correspond to each country's electricity regulations. The maximum lengths are 12 m (13 yd.) in 100-130 V and 24 m (26 yd.) in 230-240 V. For greater lengths the cross-section will be increased proportionally, e.g., 3 mm^2 (12 AWG) for a length of 32 m (35 yd.) in 240 V.

The line's apparent resistance must be less than or equal to 0.2 Ω in 110-130 V and 0.5 Ω in 230-240 V.

The x-ray unit must have a fixed connection to the electrical power supply network.

Rated voltage (off-load)	Minimum	Maximum	Maximum line current
100 V, 110 V, 130 V	90 V	144 V	12 A
230 V, 240 V	207 V	264 V	5 A

IMPORTANT
The maximum line current is obtained by following the instructions for connecting the generator's power supply cable (see paragraph 3.2.2 in Section 5).
The maximum on-load voltage variation on the line must not exceed 3%.

WARNING
If other appliances are installed on the same line, interference and voltage variations may cause your x-ray unit to function abnormally.
To prevent electric shock, this equipment must be ground connected.

4 - Preparing the Room

Compliance with all national and local codes, as well as Kodak Dental System specification (given above in Sections 3 and 4), is mandatory for high and low voltage wiring.

See Appendix 1 for dimensional diagrams.

SECTION 5

INSTALLATION

IMPORTANT
The unit is supplied with the wall framework oriented to the right for a standard installation.

1 - Preparation for Installation

1.1 - Preliminaries

Only Kodak Dental Systems qualified technicians are authorized to install the Kodak 2100 unit, and it must be installed in compliance with the mechanical and electrical installation instructions defined below.

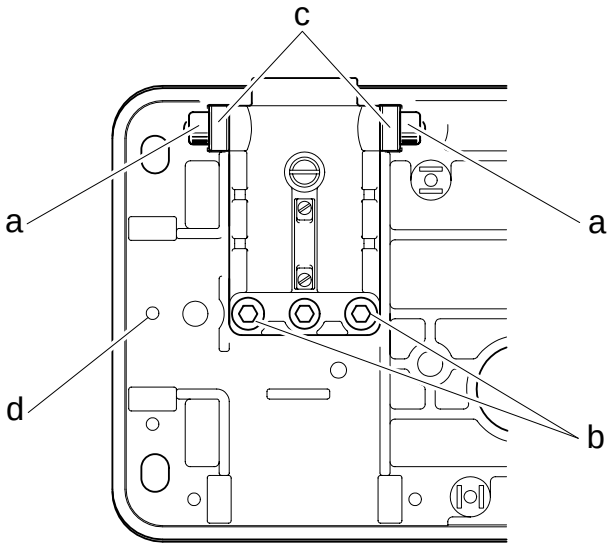
Regardless of the type of installation, the timer must be installed so that the patient and the selected parameters can be seen from the point of operation, and at a minimum distance greater than 2.5 meters.

CAUTION
Make sure that the various cables required for installation have been put in place.
Check that the voltage shown on the label of your generator corresponds to the voltage provided by your electrical power supply.
Check that the position of the jumpers on the wall framework's power board corresponds to the voltage, see paragraph 3.1 in this Section.

1.2 - Framework orientation downward or to the left

Unpack and remove the plastic cover from the framework.

Remove the pivot arm support from its initial position using a 6 mm Allen key to remove the two Socket Head Cap screws (a) and washers serving as an axis, and then the two fixing screws (b).



Remove the support clamp (c) using a 4 mm Allen key and take the clamp out through the back of the framework.

Wall framework oriented to the right (default configuration)

Wall framework oriented horizontally to the left

Wall framework oriented vertically downward

Place the clamp, passing it through the back of the framework in the openings corresponding to the orientation of the wall framework: horizontal framework oriented to the left, or framework oriented downward.

Fix the clamp with its screw. Tighten firmly.

Position the pivot arm support in the clamp so that it is held securely by the guiding ribs.

Fix the arm support with its axis screws (a) and washers and the other 2 screws (b).

Tighten gently.

2 - Mechanical Installation

2.1 - Wall framework

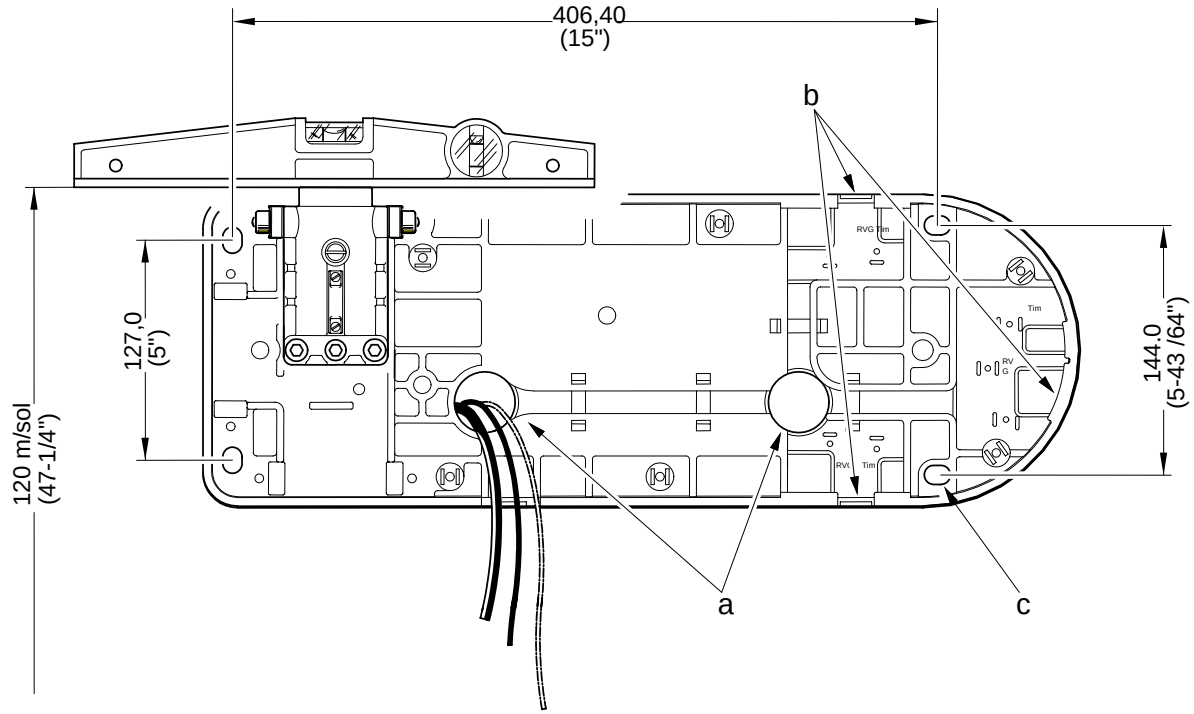
Remove the plastic insulator from the chassis, and save it for later (see paragraph 3.2.1).
It is advisable to install the top of the framework approximately 1.20 m (47-1/4 in.) above the floor.

A pre-installation template for easier positioning is available on the top flaps of the unit packaging. If you choose to use it, cut the cardboard properly.
Position the wall framework or the template at the required point with its chosen orientation (see Section 2, paragraph 1.2). Use a spirit level to check that it is horizontal (or vertical in vertical configuration).
Mark the 4 mounting points on the wall.

Drill the holes in the wall and install the fixing system chosen according to the type of wall.

Pass the power supply cable through the holes in the framework ((a) if cables are in the wall, (b) if cables are on the wall), as well as the RVG link cable and the control cable for the remote timer if necessary.
Mount the framework to the wall (c), and if necessary insert shims to ensure levelling of the frame.

Screw and tighten firmly, having first checked that the wall framework is perfectly vertical or horizontal.

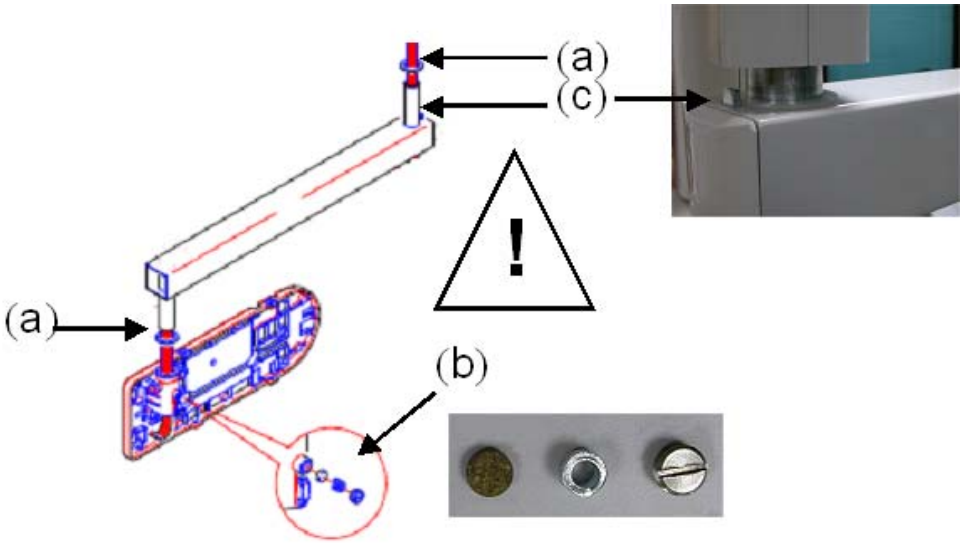


2.2 - Extension arm

Check that each pivot of the extension arm is fitted with a thin nylon ring (a).

DO NOT LUBRICATE THE PIVOTS. The scissor arm and the wall framework are fitted with self-lubricating rings.

WARNING
Install the extension arm correctly, with the stop at the scissor arm end (c).



Mount the extension arm's pivot in the top hole of the wall framework.

Install the pivot's brake kit (b).
The parts in this kit must be assembled in the correct order to ensure optimum operation of this system.
Tighten the screw only moderately at first.

2.3 - Scissor arm

WARNING
Do not loosen the strap holding the scissor arm until the generator has been mounted to it. Otherwise, if the arm suddenly swings back it could be damaged and might injure the operator. The scissor arm has not been designed for use without a generator.

The scissor arm ring is self-lubricating, and so **there is no need to lubricate** the extension arm pivot.

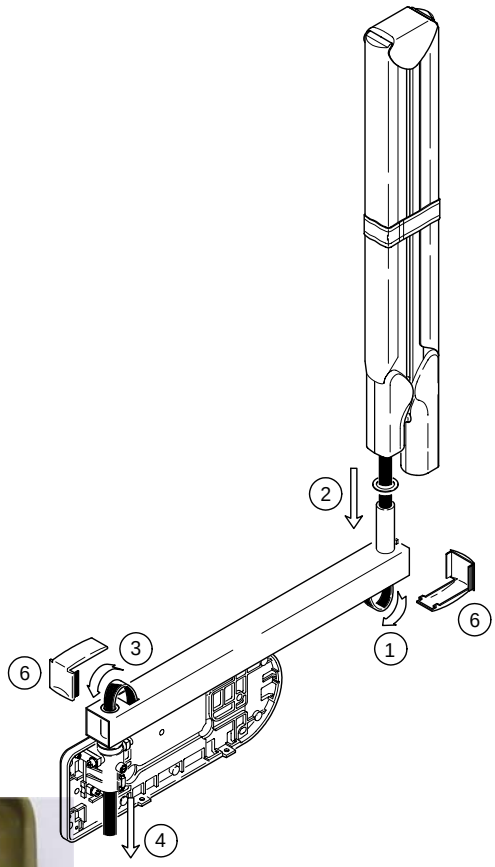
① Take the generator's power supply cable coming out of the scissor arm's axis and feed it into the extension arm pivot, bringing it out underneath.

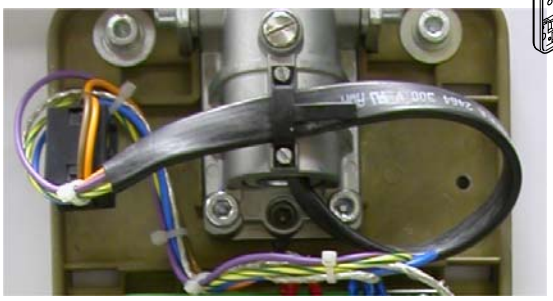
② Install the scissor arm on the extension arm while sliding the power supply cable.

③ Pass the cable along inside the extension arm using the opening located under the arm and bring it out on the wall side, through the opening located on the top of the extension arm.

④ Slide the cable into the extension arm pivot and bring it out in the wall framework.

⑤ Make a loop with the cable and attach it to the pivot bloc with the cable clamp, leaving enough length to connect. Slide the extra length inside the extension arm.





⑥ Install the two covers for the power supply cable on the extension arm, one on the wall framework side, and the other on the scissor arm side.

2.4 - Generator

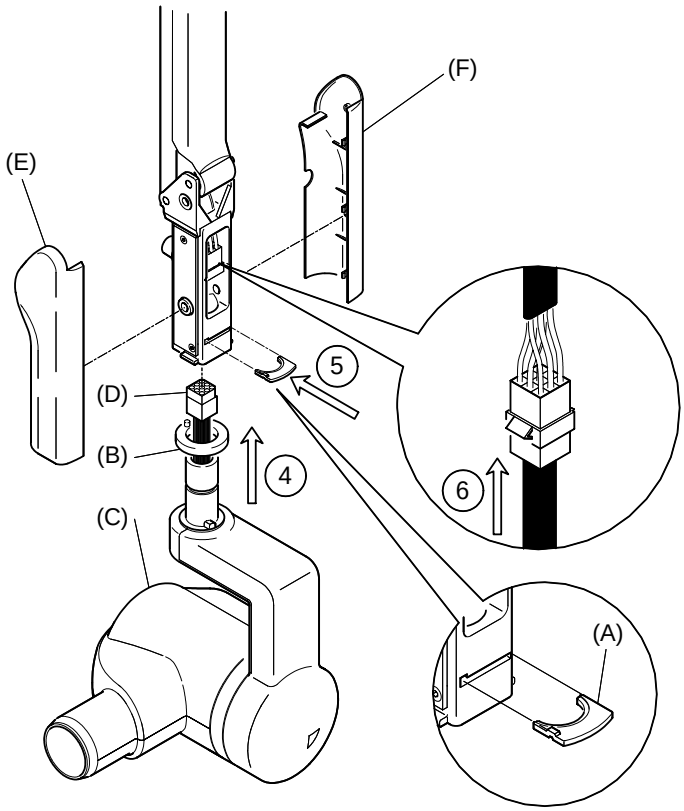
① You will find the generator's blocking key (A) in the accessory box.

② Make sure the ring preventing full rotation (B) is in place.
Remove all excess grease from the tube with a paper towel prior to putting the connector in place.

③ Bring the generator (C) from underneath, with the power supply socket toward the top (D).

④ Push upwards until the scissor arm and the generator are in contact.

⑤ Keep the generator in this position.
Position the blocking key in its slot.
You can now remove your hand from the generator.



⑥ Insert the plug in the socket located inside the scissor arm and push until they lock together.

⑦ Install the two plastic covers (E) and (F) on each side of the arm. Make sure they are properly positioned.

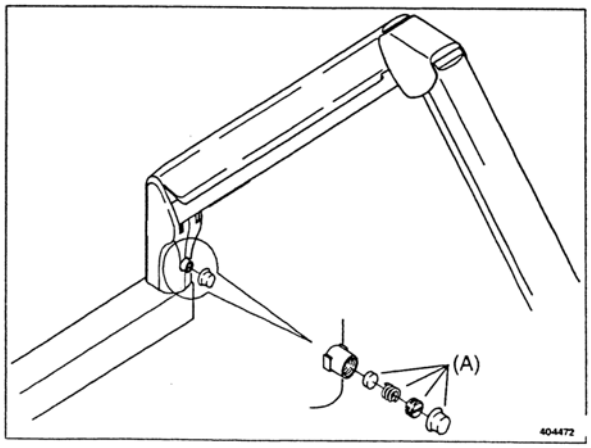
⑧ Remove the strap holding the arm.

2.5 - Installing the brake

The brake prevents drift when the arm is extended.

① Open the scissor arm slightly to install its brake kit (A).

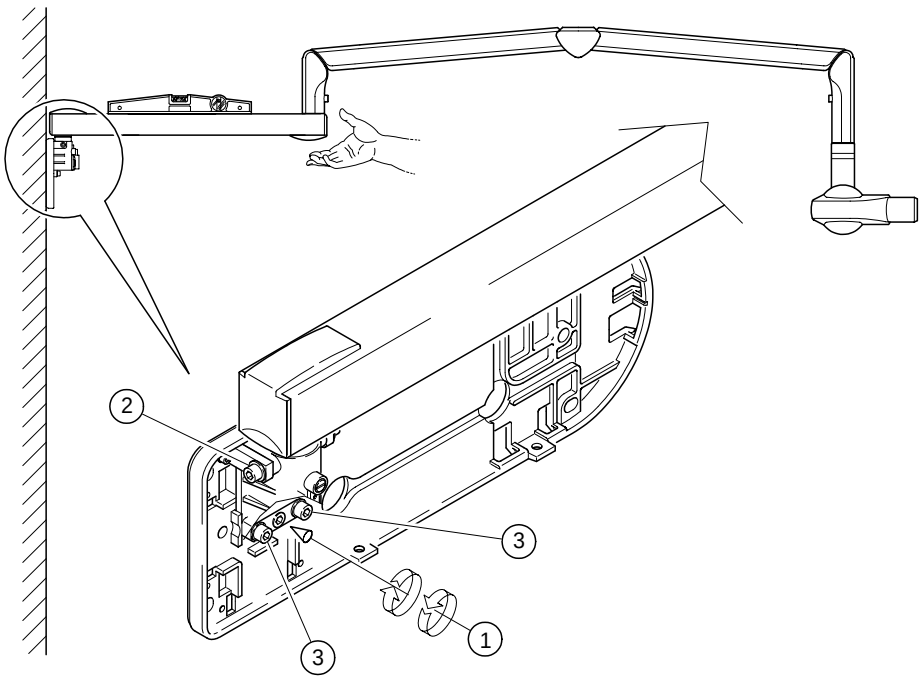
② The parts in this kit must be assembled in the correct order to ensure optimum operation of this system. Tighten the screw only moderately at first.



2.6 - Mechanical adjustments

2.6.1 - Adjusting the arm's horizontal positioning

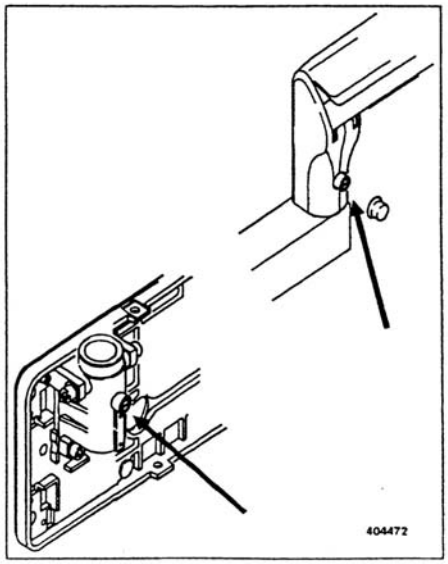
Extend the arm fully, perpendicular to the wall framework, and place a spirit level as shown in the figure below.



Adjust the stop screw ① so that the extension arm is horizontal. Maintain the extremity of the arm while operating to avoid constraints. Check that whatever position the arm is in, it does not drift.
If necessary slightly loosen the 2 screws working as an axis ② and the 2 screws ③ in order to facilitate adjustment.

Tighten the 2 screws ③ moderately, but firmly tighten the axis screws ②.

2.6.2 - Adjusting the arm drift



Remove the brake cover on the scissor arm side.

Adjust the brake to prevent horizontal drift of the arm in all positions, while conserving flexibility of movement.
Screw moderately to prevent drift.
Unscrew to make the movement more flexible.

This adjustment should be carried out on both brakes, in the wall framework and on the scissor arm.

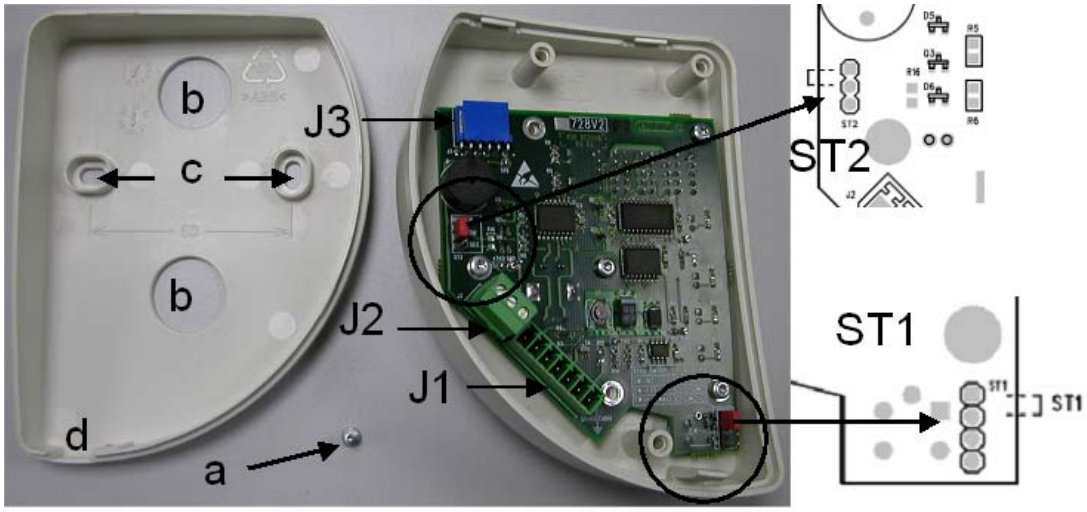
WARNING
Never tighten the brake screws firmly as this will destroy the brake pads.

Put the cover back on the scissor arm side.

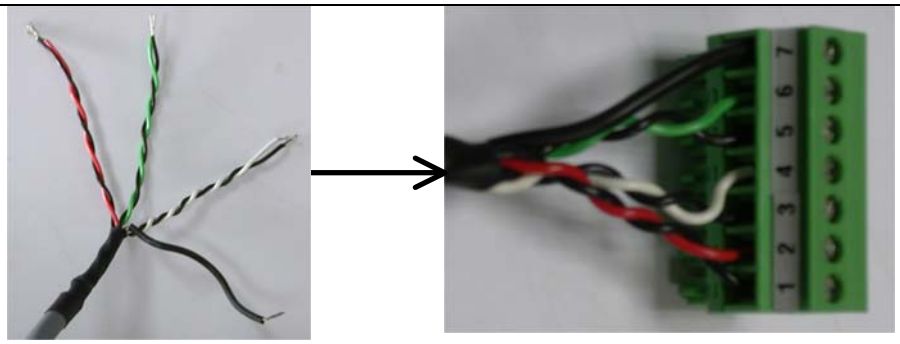
2.7 - Installing the control timer

2.7.1 - Standard mounting

Open the control timer box by unscrewing the screw (a) at the bottom edge.



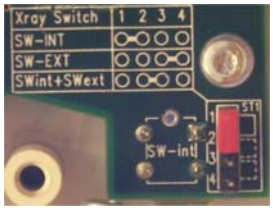
Pass the control cable through one of the holes (b) in the plate if the cable is in the wall, or open the plate at the lower end (d) if the cable is on the wall.
Position the control timer on the wall and mount it through the holes (c) made in the plate.
Remove connector J1 from the electronic board. Connect the control cable (maximum length 15 meters - 16.4 yards) on J1 as described below, after having separated the different wire pairs and protected the shield wire.



Connections for cable Alphawire 5473c			Connections for cable Belden 9503		
	Cable color code	J1 slot		Cable color code	J1 slot
Pair A	Black - red	1	Pair A	Black	1
	Red	2		Red	2
Pair B	Black - white	3	Pair B	Black	3
	White	4		White	4
Pair C	Black - green	5	Pair C	Black	5
	Green	6		Green	6
Shield		7	Shield		7

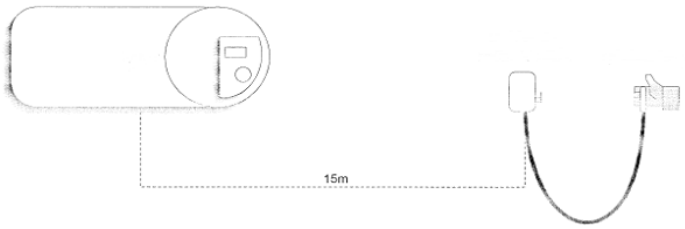
General characteristics of the cable:
15 meters (16.4 yd.) long maximum
3 over-twinned pairs + 1 shield cable section 0.25 mm^2 (AGW24)
Capacity between conductors: < 150 pF/m
Linear resistance: < 0.1 Ohm/m

Reposition connector J1 on the electronic board.
Check that the x-ray emission from the timer is enabled (ST1 jumper in the 1 and 2 position) and that the buzzer is active (ST2 jumper ON).



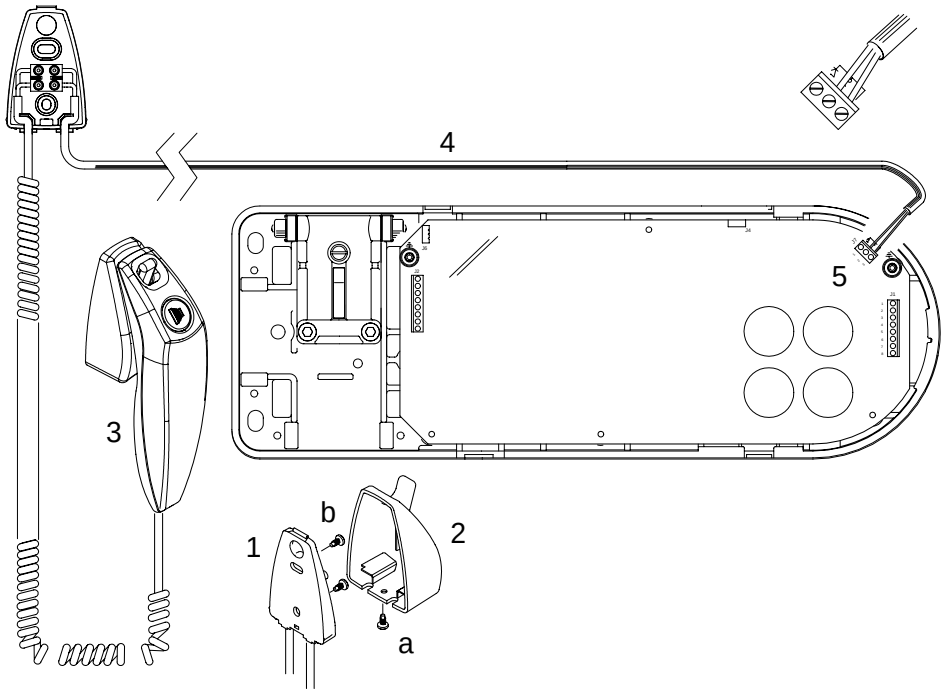
2.7.2 - Option 1 - Installation with a separate exposure hand-switch

NOTE
For installations with this option, the exposure button on the control timer must be disabled.



➢ **Separate exposure hand-switch**

Install the hand-switch cable (15 meters or 16.4 yards maximum length) between the power board and the position of the hand-switch.
The cable (4) should be a shield cable 2 x 0.22 mm² (2 x 24 AWG).



Open the connection box by unscrewing the screw (a), and separate the plate (1) from its cover (2).

Position the plate (1) on the wall in its final position and mount it through the holes (b).

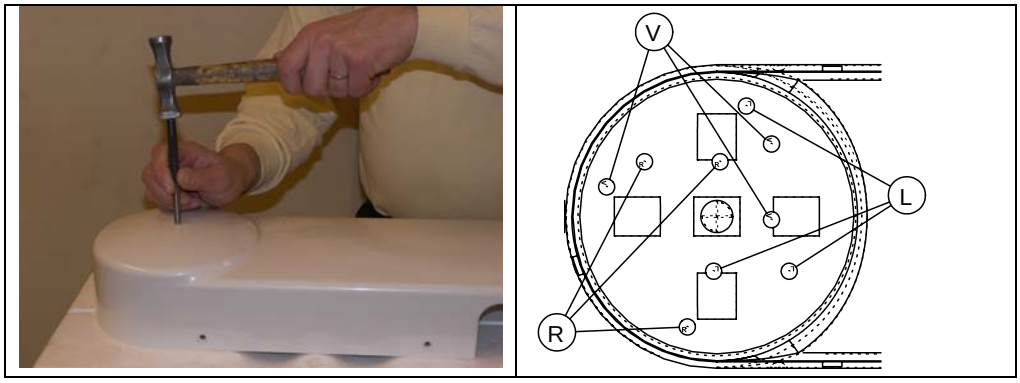
Connect the hand-switch cable to the terminals on the plate.

Close the connection box by screwing screw (a).

Connect the other end to connector J7 on the power board (5) (see paragraph 3.2.2 “Electrical Installation” in this Section).

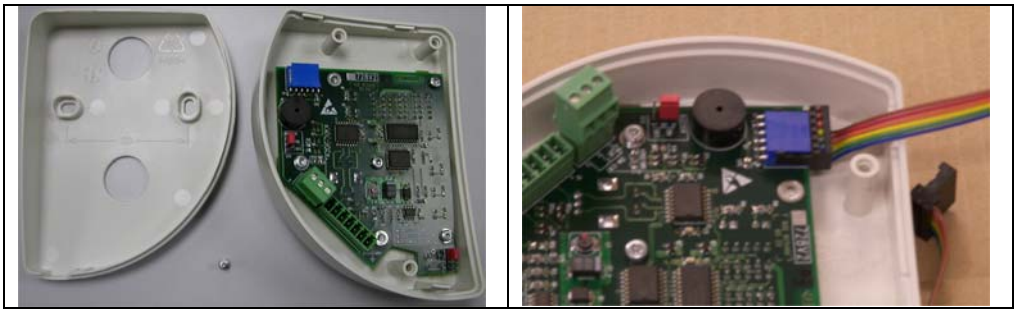
- **Control timer fixed on the framework**

Take the framework cover, and remove the central hole as shown below. Respect the way to operate, from external side of the cover toward the internal side.

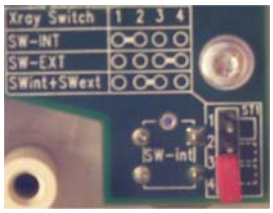


Look inside the cover and identify the 3 marks corresponding to your framework orientation: toward the right (R), toward the left (L), or vertical (V).
Use a drill with a 3.5 mm (0.12 in.) drill bit to perforate the cover at these 3 marks.

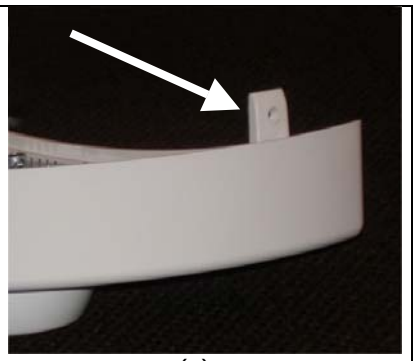
Take the control timer, and open it by unscrewing the screw at the bottom edge.



Connect the 30 cm (11-13/16 in.) link cable to connector J3 of the timer board. Disable the x-ray emission from the timer by setting jumper ST1 in the 3 and 4 position. Also disable the buzzer by setting jumper ST2 to OFF.



(a) Break the small plastic tongue.

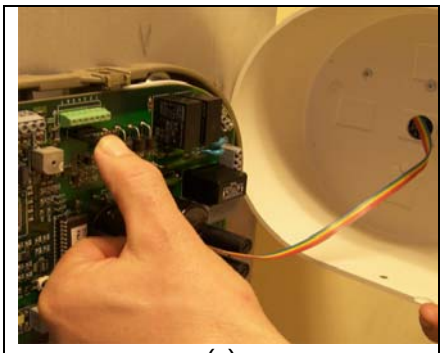


(a)

(b) Pass the link cable through the hole of the framework cover, and mount the control timer cover on the framework cover with 3 screws.

(b)

(c) Connect the link cable to connector J3 on the power board (see paragraph 3.2.2 “Electrical Installation” in this Section).

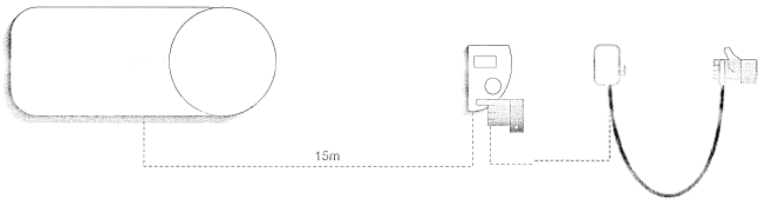


(c)

IMPORTANT
Local regulations may require disabling the x-ray emission from the timer if a separate exposure button is available. Do not forget to position jumpers ST1 and ST2 in their correct positions.

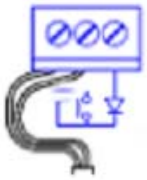
2.7.3 - Option 2 - Installation with 2 separate exposure switches (mainly for U.S. market)

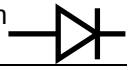
NOTE
For installations with this option, both the exposure button on the control timer and the exposure hand-switch must be pressed simultaneously to emit x-rays.



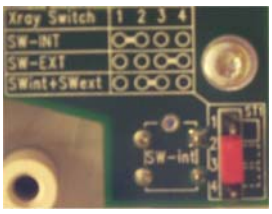
Install the control cable between the control timer and the power board.
Position the control timer on the wall and mount it.
For both, follow the instructions as described in paragraph 2.7.1.

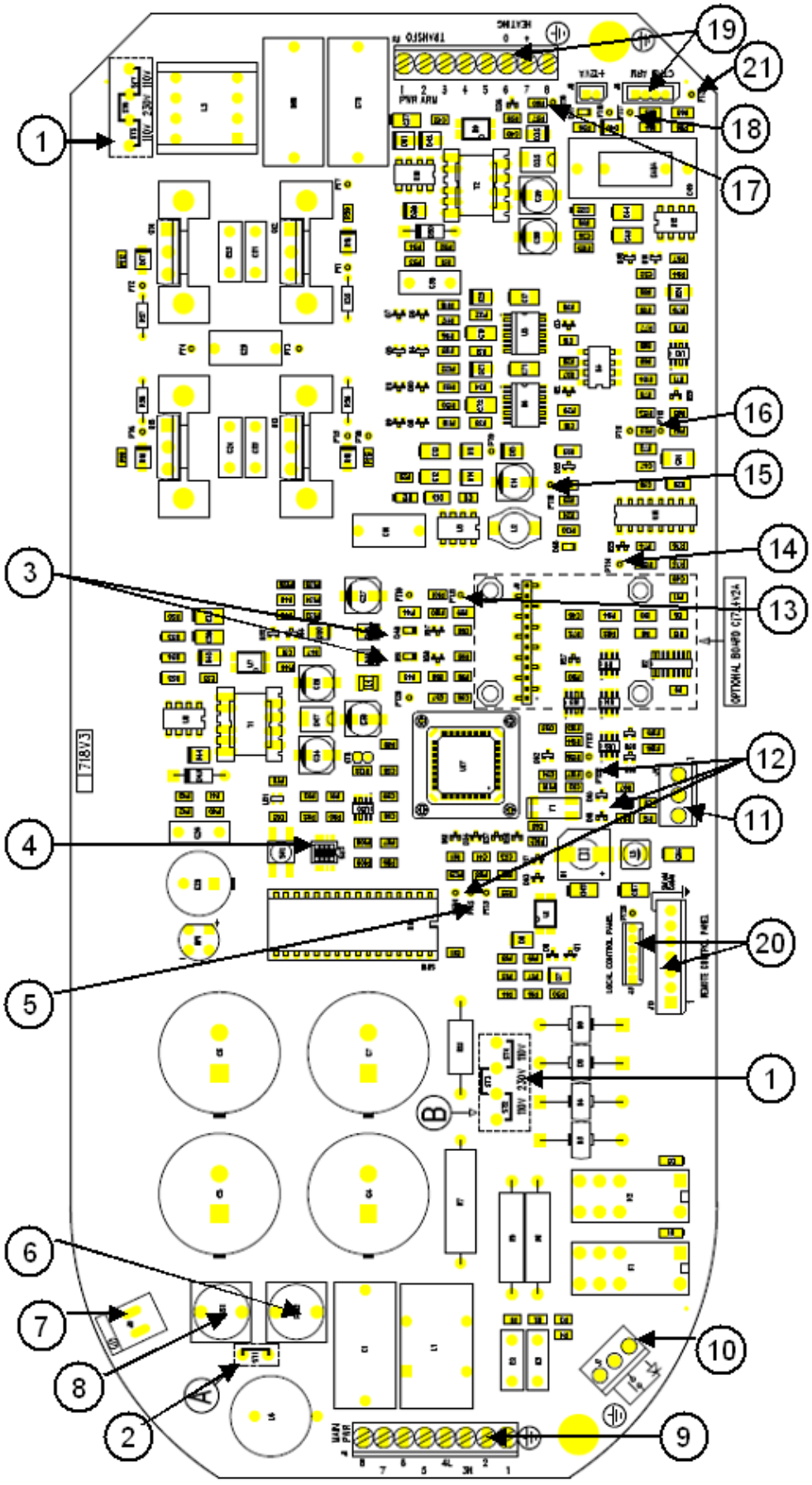
Install the hand-switch cable (shield cable 2 x 0.22 mm² (2 x 24 AWG)) between the exposure hand-switch and the control timer.
Install the hand-switch as described in paragraph 2.7.2.
Connect the hand-switch cable to connector J2 on the control timer electronic board, as indicated below:



WARNING
Follow the connection diagram. Neither of the 2 wires of the hand-switch cable should be connected to the diode terminal, represented by 

Enable the x-ray emission only when both the exposure button on control timer and the exposure hand-switch are pressed simultaneously, by setting jumper ST1 in the 2 and 3 position. Check that the buzzer is enabled (ST2 jumper ON).

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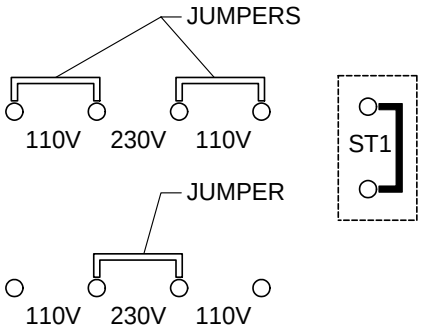
Power board layout	
Position	**Description**
1	Configuration 110V / 230 V (2 sets) (also referred to as B)
2	ST1 configuration (used only for 110V) (also referred to as A)
3	Green LEDs: 12V D48 and PT19 - 5V D51 and PT20
4	Dipswitches SW2
5	KV return PT13 - IHEAT return PT15
6	Neutral Fuse (except for mobile option)
7	"Ready state" light connector 230 V - 60 W mx
8	Fuse 5 A for 230 V - 10 A for 110 V
9	Main power supply connector
10	Separate x-ray switch connector
11	Synchro RVG connector
12	I2C bus PT22 PT23 PT24
13	Vdac ref. PT21
14	KV ref. PT14
15	12V non isolated: D65 and PT10
16	H Bridge control PT11 and PT12
17	VHEAT PT16 and D41
18	MA return PT17 Relay R control PT18
19	Arm cable connector
20	J10 or J3 Timer connector
21	Ground - 0 mA PT25

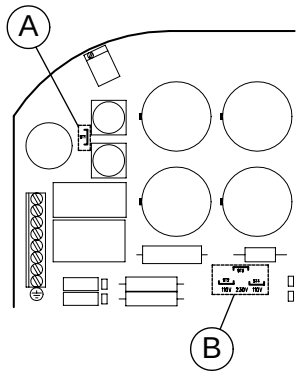
3.1 - Power board configuration

Check the main voltage through the correct position of the jumpers on the board in the 2 positions (A) and (B).

Check that the sets of jumpers on the board correspond to the measured voltage.

- on 110 V: 2 times 2 jumpers (B)
  1 time 1 jumper (A)
- on 230 V: 2 times 1 jumper (B)
  no jumper (A)





Verify that fuse F2 (6) is a neutral link, except for the optional mobile stand unit.

3.2 - Power board installation

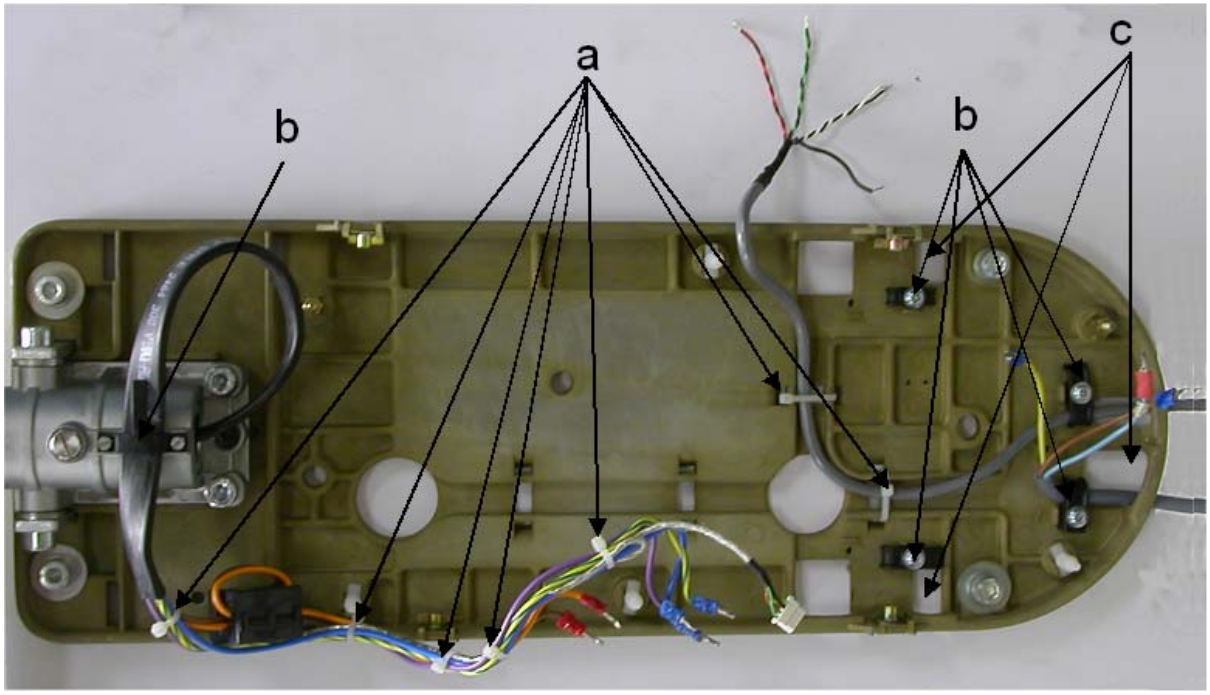
3.2.1 - Mechanical installation

Check that the electrical cable is not live.

Position the various cables in the framework using the cable-clamps (b) and cable ties (a) (not supplied), according to the diagram below:

- Generator cable
- Timer cable
- Remote exposure switch cable (optional)
- Electrical cable
- RVG cable (optional)
- Connection cable to the “Ready state” lamp

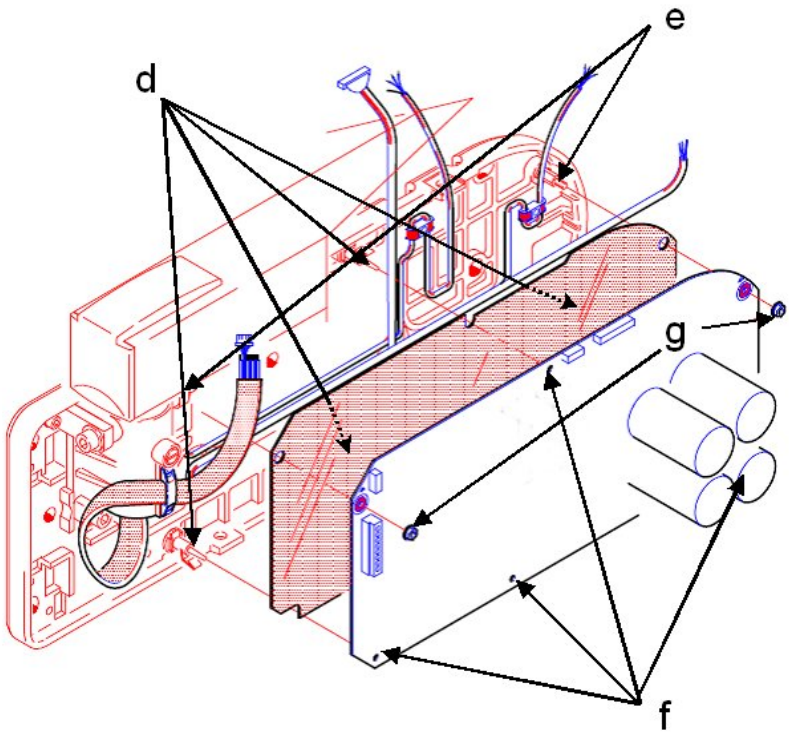
External cables must pass through the openings (c) in the wall framework.



Position the insulating sheet on the 4 plastic pins (d) and on the 2 metal ground pins (e) (see next diagram).

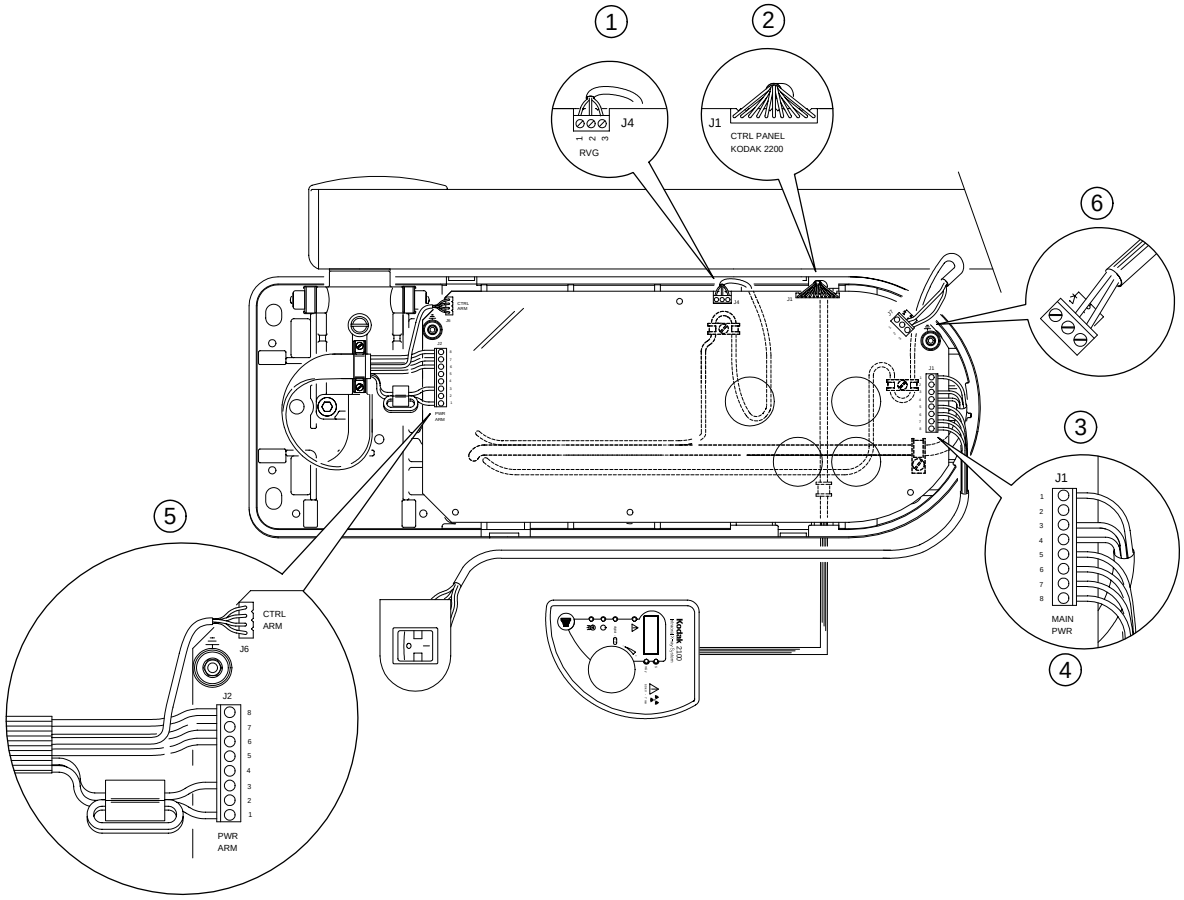
Install the board in the wall framework on the nylon and metal pins.

Mount the nylon screws (f) on the plastic pins (d) and the metal screws (g) on the metal pins (e).



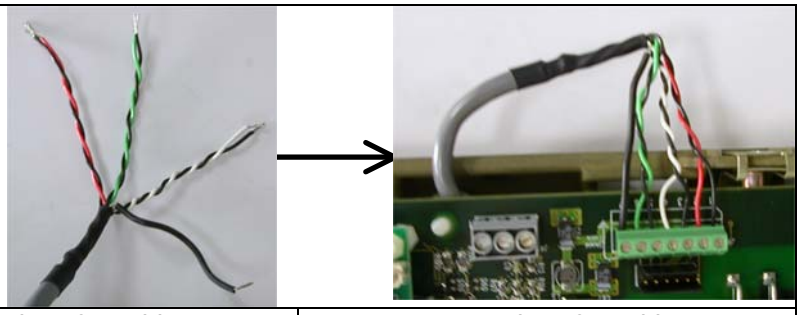
3.2.2 - Wiring

Connect all the wires according to the wiring diagrams below.



① Connect RVG link cable to the RVG connector (optional)
Yellow wire on 1
White wire on 2
Neutral blue on 3

② Connect the control timer cable to the power board connector (J10) as described in following table, after having separated the different wire pairs and protected the shield wire. In the case of a separate exposure switch configuration, connect the control timer link cable to connector J3.



Connections for cable Alphawire 5473c		
	Cable color code	J10 slot
Pair A	Black - red	1
	Red	2
Pair B	Black - white	3
	White	4
Pair C	Black - green	5
	Green	6
Shield		7

Connections for cable Belden 9503		
	Cable color code	J10 slot
Pair A	Black	1
	Red	2
Pair B	Black	3
	White	4
Pair C	Black	5
	Green	6
Shield		7

General characteristics of the cable:
15 meters (16.4 yd.) long maximum
3 over-twinned pairs + 1 shield cable section 0,25 mm^2 (AGW24)
Capacity between conductors: < 150 pF/m
Linear resistance: < 0.1 Ohm/m

③④Electrical wiring: MAIN PWR connector on the board and On/Off button

Main Power ③

- Power supply cable: Ground on 1 (reference ⏚)
- Power supply cable: Neutral on 3 (reference N)
- Power supply cable: Phase on 4 (reference L)

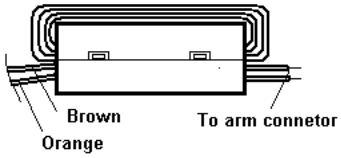
On/Off button ④

- On/off cable: wire 5 on 5
- On/off cable: wire 6 on 6
- On/off cable: wire 7 on 7
- On/off cable: wire 8 on 8

⑤Generator wiring: PWR ARM and CTRL ARM connectors on the board

- Arm cable: brown wire on PWR ARM-1
- Arm cable: orange wire on PWR ARM-3
- Arm cable: blue wire on PWR ARM-6
- Arm cable: violet wire on PWR ARM-7
- Arm cable: green-yellow wire on PWR ARM-8
- Arm cable: white 4-pin plug on CTRL ARM

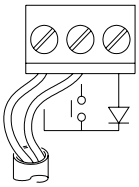
Make one turn with the brown and orange wires around the ferrite provided with the arm as described in following diagram.

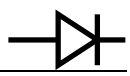


Place the excess cable inside the extension arm.

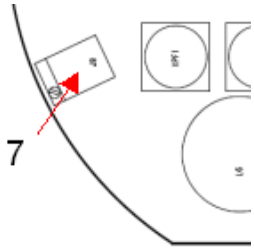
⑥ Remote exposure switch (optional)

Connect the 2 wires: shield in 3, other wire in 2.



WARNING
Follow the connection diagram. Neither of the 2 wires of the hand-switch cable should be connected to the diode terminal, represented by 

⑦ Warning lamp: a connection has been provided making it possible to indicate the “Ready” condition at a location away from the control position, in compliance with standards in force. To do this, connect a 110 V or 230 V bulb (depending on the operating voltage) to the terminals of connector J9 (7). Use usual means (i.e., a fuse) to protect this circuit.



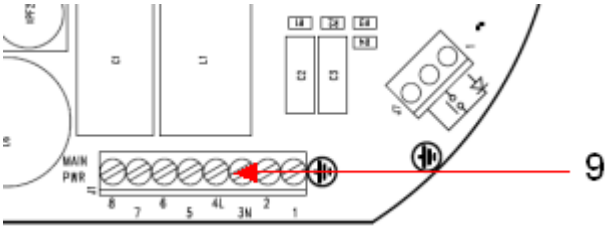
SECTION 6

SETUP

1 - Checking the Voltage

Use the voltmeter in the 300 V AC range.

Switch the unit OFF.
Connect the voltmeter to the **L** and **N** terminals of the MAIN PWR connector (ref. 9) on the power board.



Switch the unit ON.
Set the longer time (1,25 sec).
Note the voltmeter value (no-load voltage).

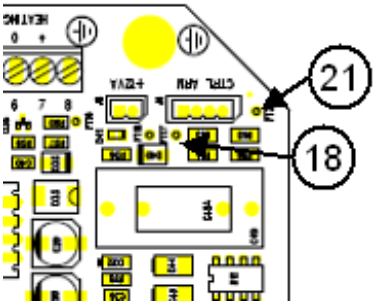
Stand well behind the generator.
Make an exposure.
Note the voltmeter value during the exposure (on-load voltage).

The result of the following formula: ($V_{no\text{-}load}$ - $V_{on\text{-}load)}$ must be less than 4.5 V in 100, 110 or 130 V, and less than 9 V in 230 or 240 V (corresponding to a 3% variation).

If not, refer to “Required Electrical Specifications” in Section 4, paragraph 3.

2 - Checking the mA

Connect a 30V range voltmeter to the test points **0 mA** (Ground ⏚) (ref. 21 - PT25) and **RTN mA** (ref. 18 - PT17) complying with the polarities, with the plus on the **0 mA** side.



The green LEDs (ref. 3) of the power board corresponding to +12 V and +5 V must both light up.

Set the longer time (1.25 sec).
Stand well behind the generator and make an exposure.
Note the voltmeter value.
This value must be between 6 V and 8V; if not, contact a Kodak technician.

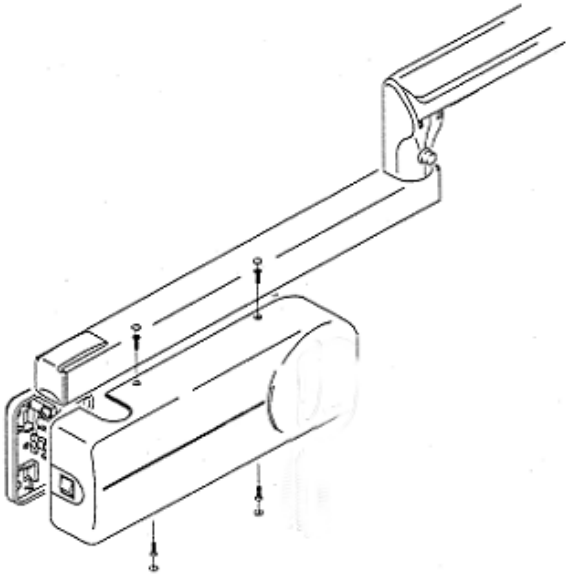
The measurement is the result of the product of the current (mA) multiplied by a resistance of 1 kΩ implemented on the board.

3 - End of Installation

Place the On/Off switch in the cover recess corresponding to your orientation.

Check that all the plugs and cables are fixed securely.

Install the framework cover with 4 screws as shown below and insert the screw caps.



Clean the whole unit. Use an alcohol-based product; solvent-based products must never be used.

Follow the manufacturer's recommendations for safety precautions when using the cleaning product.

IMPORTANT
Fill out all documents concerning the installation and the warranty.
Make sure that all manuals are left on site for the operators.

SECTION 7

SERVICING MENUS

1 - User Mode

This menu offers the possibility to choose the length of the cone (necessary to calculate the correct emitted dose), and the type of imaging receptor (based on local regulations).

To enter the user menu:

Turn the unit ON to activate the self-test sequence.
At the end of the self-test, the display will show the software information (for example, “F718” followed by “1.00”). At this time, press briefly on the control timer selection knob to enter the Menu.

Access is available when “USEr” message is displayed.

The display will first display intermittently the first parameter (“P 01”) and the setting value (for example, Yes).
To change from one parameter to another, just turn the selection knob one step in any direction.

To change the parameters:

To change the value of a parameter, press the selection knob for a longer time (at least 3 seconds) until “EDIT” is displayed and you hear a sound. Both indicate you are in the change mode.
The parameter value starts blinking. Turn the selection knob to modify the value.

- To validate the choice, press the selection knob for a longer time (at least 3 seconds) until “COPY” is displayed and you hear a change confirmation sound.
- To keep the initial value, just press the selection knob briefly. “Abor” is displayed as confirmation.

The system returns to the parameters/programs mode.

To exit this "user mode"

Press the selection knob briefly. “Quit” is displayed just before the system returns to operational mode.

N°	Parameters	Choice
P 01	Digital receptor	YES / NO
P 02	Long cone	YES / NO

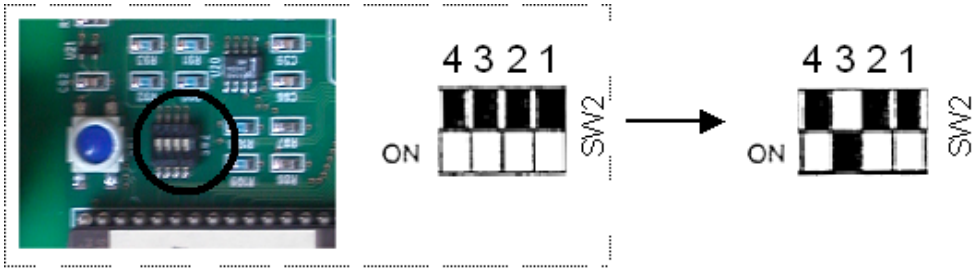
2 - Technician Mode

This mode offers the possibility only for a certified or authorized technician to modify some key elements of the program contained in the intra-oral unit.

WARNING
If you are not a certified or authorized technician, do not enter the program. The only parameters you can modify are for customizing the unit settings based on your equipment, and these are described in the User's Guide.

Before entering in Technical menus:

Switch the unit OFF.
Open the framework cover.
On the power board set the dipswitch 3 of SW2 to ON.



Technical Menus:

2 different menus are available:

- Counters menu
- Technical parameters and programs menu.

1 - Counters menu

NOTE
This menu is only a display menu. All counters except C 02 can be reinitialized from the "Technical parameters and programs menu."

Switch the unit ON to activate the self-test sequence.
At the end of the self-test, the display will show the software information (i.e., "F718" followed by "1.00"). At this time, press the control timer selection knob for a longer time (at least 3 seconds) to enter the Menu.

Access is available when "DiaG" message is displayed.

The display will first display intermittently the first parameter ("E 01") and its value. To change from one parameter to another, just turn the selection knob one step in any direction.

Parameter Code Number	Description	Range of Values	Unit Factor
C 01	Exposure counter. Can be reinitialized.	0 to 9999	x 10
C 02	Total exposure counter. Cannot be modified.	0 to 9999	x 10
E 01 to E 59	Diagnostic errors counters (refer to error messages in Section 9, paragraph 2.2). Counter can be reinitialized.	0 to 255	x 1

2 - Technical parameters and programs menu

NOTE
This menu is a settings menu. It allows either to adjust some parameters of the software (Sr parameters) or to reinitialize some counters or parameters (Pr parameters).

Switch the unit ON, to activate the self-test sequence.
At the end of the self-test, the display will show the software information (i.e., “F718” followed by “1.00”). At this time, press briefly on the x-ray exposure button to enter the Menu.

Access is available when “tECH” message is displayed.

The display will first display intermittently the first parameter (“Sr 1.1”) and its value. To change from one parameter to another, just turn the selection knob one step in any direction.

To change the value of a parameter, press the selection knob for a longer time (at least 3 seconds) until you hear a sound that indicates you are in the change mode. The parameter value starts blinking. Turn the selection knob to modify its value.

- To validate the choice, press the selection knob for a longer time (at least 3 seconds) until you hear a change confirmation sound. At the same time, the display will display “COPY” in the case of a parameter change or “run” in the case of reinitialization.
- To keep the initial value, just press briefly on the selection knob. “Abor” is displayed as confirmation.

The system returns to the parameters/programs mode.

Parameter Code Number	Description	Range of Values
Sr 1.1	Correction of minimum frequency of 4 mA invertor	+/- 5
Sr 1.2	Correction of minimum frequency of 7 mA invertor	+/- 5
Sr 2.1	Correction of 60 kV setting	+/- 10
Sr 2.1	Correction of 70 kV setting	+/- 10
Sr 3.1	Correction of heating voltage of filament for 60 kV 4 mA setting	+/- 20
Sr 3.2	Correction of heating voltage of filament for 70 kV 4 mA setting	+/- 20
Sr 3.3	Correction of heating voltage of filament for 60 kV 7 mA setting	+/- 20
Sr 3.4	Correction of heating voltage of filament for 70 kV 7 mA setting	+/- 20
Pr 1	Reinitialization of E01 to E59 diagnostic error counters	**NO**/YES
Pr 2	Reinitialization of C01 exposure counter	**NO**/ YES
Pr 3	“Factory default” reinitialization. The memory of the unit is reinitialized with the “out-of-factory” parameters (user’s parameters, technical parameters, counters, etc.)	**NO**/ YES

To exit this "technical mode"

Press the knob button briefly. “Quit” is displayed just before the system returns to operational mode. The display continues to blink, and displays “Src”, until the dipswitch 3 of SW2 is set back to its initial OFF position.

IMPORTANT
Do not forget to set the dipswitch 3 of SW2 back to OFF.

Switch the unit OFF.

NOTE
When exiting the technician mode, you can immediately return to the “technician mode” or enter the “user mode” by acting on the knob (short or long pressure) or on the exposure button, without switching the unit OFF and restarting it.

SECTION 8

PREVENTIVE MAINTENANCE

1 - Cleaning and Disinfecting

For cleaning, you are advised to use a **non-corrosive** alcohol-based product, and to avoid allowing liquids to drip into the unit.
Follow the manufacturer's recommendations for safety precautions when using the cleaning product.

The usual disinfectant products can be used, but we recommend that you protect the unit from contamination by using barriers available from dental dealers.
Follow the manufacturer's recommendations for safety precautions when using the disinfectant product.

2 - Maintenance Checks

Kodak recommends carrying out the periodic preventive maintenance operations described below. They should be performed when the unit is first installed and then annually by a qualified technician.

IMPORTANT
If your Kodak 2100 unit does not satisfy all these checks, refer to the "Corrective Maintenance" Section in this guide, or contact your authorized Kodak Dental Systems distributor. In the meantime you should not use the equipment.

2.1 - Generator

Check that the specifications label is legible and intact.

Check that there are no oil leaks.

2.2 - Mounting the complete unit to the wall

Check that all the labels are clearly legible.

Check that the wall framework is securely attached to the wall. If it is not, check the installation exactly as stipulated in the procedure described in Section 5, "Installation."

If the installation includes a 825 mm (32-1/2 in.) extension arm, check that the 360° rotation of the scissor arm is restricted by the limitation system installed on the extension arm to prevent the power supply cable from being ripped out.

2.3 - Flexible movement

Check that the arm is flexible in all positions, and that it remains immobile when no longer handled.

2.4 - Control timer and electrical installation

Check that the symbols are always clearly legible.

Checks that the control timer cable and the power supply cable are in good condition.

Check that the ground is correctly installed.

Check that the exposure switch returns to its initial position after use.

2.5 - Operation

Turn the timer ON.

Check that the green LED “on” is lit.

Set the longer exposure time by using the knob button (1.25 sec).

Stand well behind the generator and take an exposure.

Check that the x-ray emission light comes on during the exposure, that the counter counts down to zero and that the audible signal stops when the x-ray emission terminates.

Make another exposure and check that when the exposure switch is released before the end of the exposure the display unit indicates “E01” and an audible signal different from the previous one is emitted.

Self-test

Turn the unit OFF, then turn it back ON.

An automatic self-test is activated when you turn the unit ON.
The test phase starts with a simultaneous test of the display and alarm sounds.
Then the unit will proceed with the test of the system.
At the end of this test indicated by a short beep, the firmware version and the number of exposures (divided by 10) made since the unit was put into operation are displayed.

If the test if faulty, the corresponding error code will be displayed.

IMPORTANT
If the result of one of these checks is not satisfactory, we recommend that you contact an authorized Kodak Dental Systems technician for assistance. In the meantime, do not use the equipment.

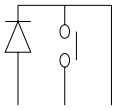
At the end of this verification, make sure that the User's Manual remains with the unit.

SECTION 9

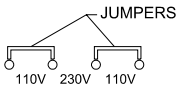
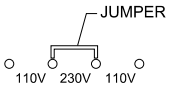
CORRECTIVE MAINTENANCE

1 - Main Components

Connectors

MAIN PWR	(9)	Electrical power supply and On/Off button
PWR ARM	(19)	Generator cable
CTRL ARM	(19)	Generator cable (safety devices)
RVG	(11)	Cable for RVG
J3 or J10	(20)	Timer
J9	(7)	Ready state lamp connector
		
	(10)	Remote exposure switch cable

Jumpers

	(1)	Adaptation to 110 V - 230 V voltage
		
	(2)	110 V only

LEDS

D48	(3)	+12 V
D51	(3)	+5 V
D41	(17)	Heating voltage
D65	(15)	12V non isolated

Test Points

PT10	(15)	+5 V non isolated
PT11, PT12	(16)	H Bridge control
PT13	(5)	KV return
PT14	(14)	KV ref
PT15	(5)	IHEAT return
PT16	(17)	VHEAT return
PT17	(18)	MA return
PT18	(18)	Relay R control
PT19	(3)	+12 V
PT20	(3)	+5 V
PT21	(13)	Vdac ref
PT22, PT23, PT24	(12)	I2C bus
PT25	(21)	Ground - 0 mA

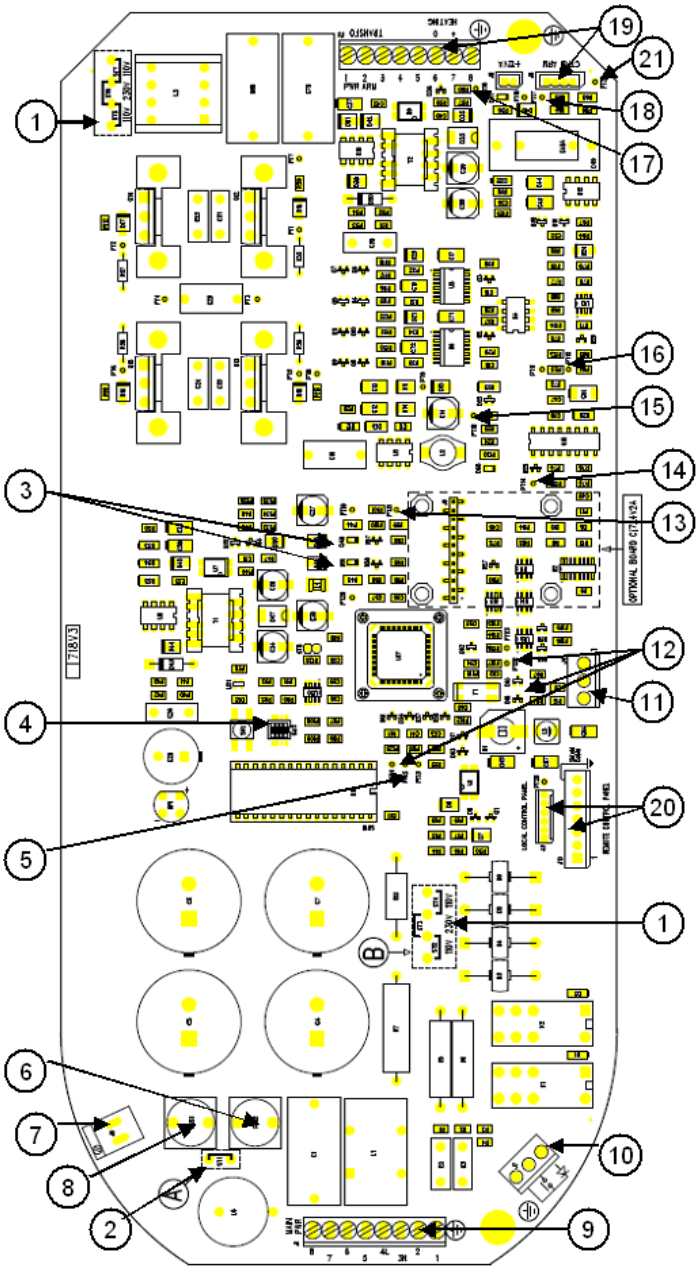
Fuses

Protection of power components

F1 (8) in 230 V/250 V: 5 A 5 x 20 fast,
with high breaking capacity - UL & IEC60127-2.
Ref: 0001.1014 (SCHURTER) or 1942100002 (WICKMANN).

in 100 V/110 V/130 V: 10 A 5 x 20 fast,
with high breaking capacity - UL & IEC60127-2.
Ref: 0001.1011 (SCHURTER) or 1941500002 (WICKMANN).

Neutral line
F 2 (6) neutral links (except for mobile option).



2 - Diagnosis

2.1 - Timer self-test

Turn the unit OFF, and then turn it back ON.
An automatic self-test is activated when you turn the unit ON.
The test phase starts with a simultaneous test of the display and alarm sounds.
Then the unit will proceed with the test of the system.
At the end of this test indicated by a short beep, the firmware version and the number of exposures (divided by 10) made since the unit was put into operation are displayed.

If the test if faulty, the corresponding error code will be displayed.

IMPORTANT
If the result of one of these checks is not satisfactory, we recommend that you contact an authorized Kodak Dental Systems technician for assistance. In the meantime, do not use the equipment.

2.2 - Error messages

Error Code	Reference	Description
00	ERR_RAS	No problem
01	ERR_OPERATOR	Premature release of control switch
02	ERR_XRAY_SWITCH	X-ray control activated during unit switch on
03	ERR_XRAY_SWITCH_SECURITY	Malfunction of x-ray control safety
04	ERR_EXPO_TIMEOUT_SECURITY	Malfunction of exposure time safety
10	ERR_KV_REF_SYS	Error on kV reference
11	ERR_KV_REF_LOW	kV reference too low
12	ERR_KV_REF_HIGH	kV reference too high
13	ERR_KV_FEEDBACK_SYS	Error in kV return (no-load value different from 0) Error in connection of kV return
14	ERR_KV_FEEDBACK_LOW	kV return low
15	ERR_KV_FEEDBACK_HIGH	kV return high
16	ERR_FMIN_SYS	Error in no signal frequency inverter
17	ERR_FMIN_LOW	Inverter frequency too low
18	ERR_FMIN_HIGH	Inverter frequency too high
20	ERR_HEATING_VOLTAGE_SYS	Error in voltage measure of heating filament (no-load value different from 0)
21	ERR_HEATING_VOLTAGE_LOW	Voltage for filament heating too low
22	ERR_HEATING_VOLTAGE_HIGH	Voltage for filament heating too high
23	ERR_HEATING_CURRENT_SYS	Error in current for filament heating (no-load value different from 0)
24	ERR_HEATING_CURRENT_LOW	Error in current for heating filament (value 0 when on-load)
30	ERR_POWER_ALARM	Problem with line voltage setting or filtering capacitor
40	ERR_WATCHDOG	Watchdog release problem
41	ERR_PROGRAM_INTEGRITY	Default in firmware integrity
42	ERR_PROGRAM_FAULT	Default in firmware functions
43	ERR_SHOT_PRAMETERS	Last exposure parameters (exposure time)
44	ERR_TECHNICAL_DATA	Technical parameters (settings)
45	ERR_GENERATOR_COOLING_DATA	Parameters of tube head (cooling)
46	ERR_USER_DATA	User's settings (digital, long cone)
47	ERR_SW2_CONFIG	Wrong configuration of SW2 dipswitch
50	ERR_I2C	I²C bus
51	ERR_I2C_INT	Internal I²C bus
52	ERR_I2C_EXT	External I²C bus
53	ERR_EEPROM	Error in accessing serial Eprom
54	ERR_IHM	Error in accessing Control Panel

2.3 - CANCELLING THE DIFFERENT ERROR MESSAGES

MESSAGE	CAUSE	HOW TO CANCEL
I01	Cooling cycle. This message can appear during an intensive rate of use.	Do not turn the system off. The error message will disappear when the system returns to a satisfactory temperature.
Caution **If you turn off power to the system, the microprocessor doesn't calculate the cooling time, and for safety reasons considers that the apparatus has not gone into the cooling cycle.**		
E01	Premature release of the radiography control button. The display indicates the remaining exposure time.	Press the selector knob to stop the alarm.
All other errors (E02 to E54)	The microprocessor has detected a problem.	Turn the unit off and restart. If the problem persists, call a qualified service technician and discontinue using the equipment.

2.4 - Trouble-shooting hints

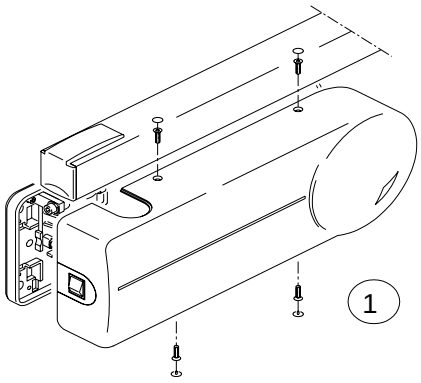
PROBLEM	CAUSE	SOLUTION
Nothing lights up	Unit disconnected	Connect the unit
	Fuse F1 defective	Change the fuse
	Main circuit breaker OFF	Put it ON
Nothing lights up on the control unit	Control unit disconnected	Connect the control unit
	Fuse F1 defective	Change the fuse
	Defective control unit	Replace the control unit
No x-ray emission	The generator is cooling	Wait for the "**I01**" message to disappear
	Exposure switch defective	Replace the exposure switch
Emission OK but exposure is too light, or even white	Generator incorrectly positioned	Adjust position
	Exposure time too short	Modify the time selection
	Development time too short	Refer to development instructions
	Developer too cold	Heat it
	Developer too old	Change it
	Developer diluted	Change it
	RVG/film key incorrectly selected	Adjust according to equipment used
	Receptor backwards	Check positioning section
	Incorrect installation	Call a qualified service technician
Emission OK, but exposure is too dark	Exposure time too long	Modify the time selection
	Development time too long	Refer to development instructions
	Developer too hot	Let it cool down
	Developer too concentrated	Adjust or replace it
	RVG/film key incorrectly selected	Adjust according to equipment used

3 - Part Replacement Procedures

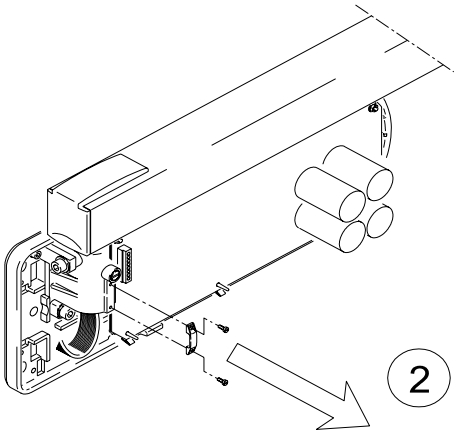
3.1 - Changing the generator’s power supply cable

0 - Turn the unit OFF.

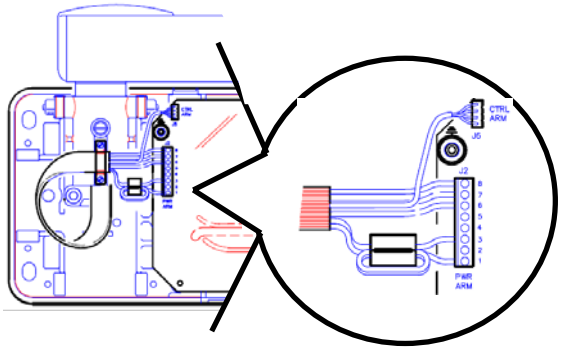
1 - Remove the wall framework's cover by removing the screw covers and the 4 fixing screws.
Take the On/Off switch out of its recess.



2 - Remove the cable-clamp from the pivot bloc.

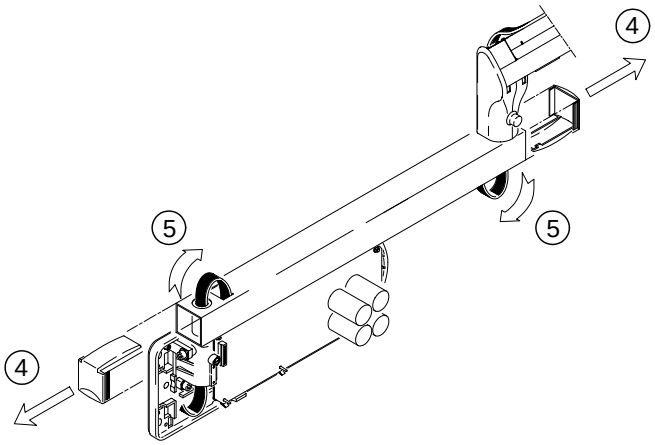


3 - Disconnect the arm's cable from the PWR ARM and CTRL ARM connectors.



4 - Remove the two plastic cable covers on the extension arm, revealing the arm cable.

5 - Take the cable out of the extension arm and let it hang from the end of the scissor arm.

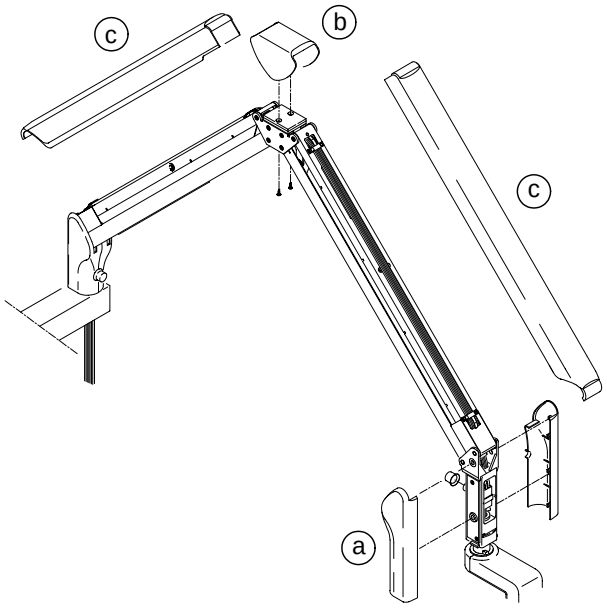


6 - Remove the scissor arm covers in the following order:

(a) Covers of the generator support and the plastic cap.

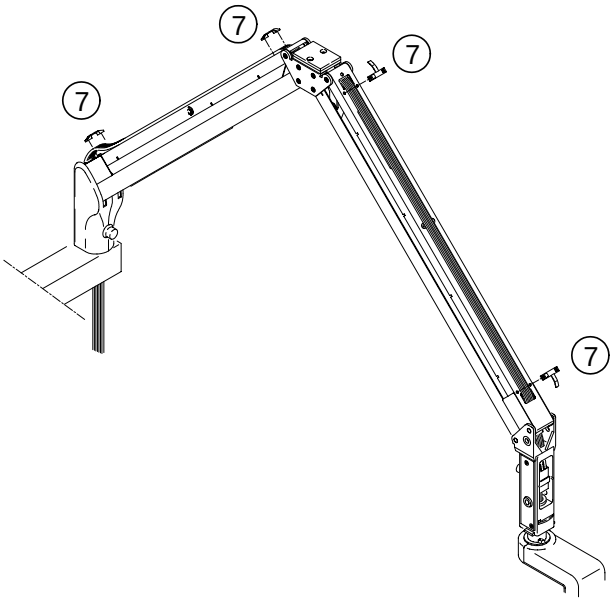
(b) Cover for the central hinge, via 2 screws accessible from underneath.

(c) The 2 covers on each part of the scissor arm.

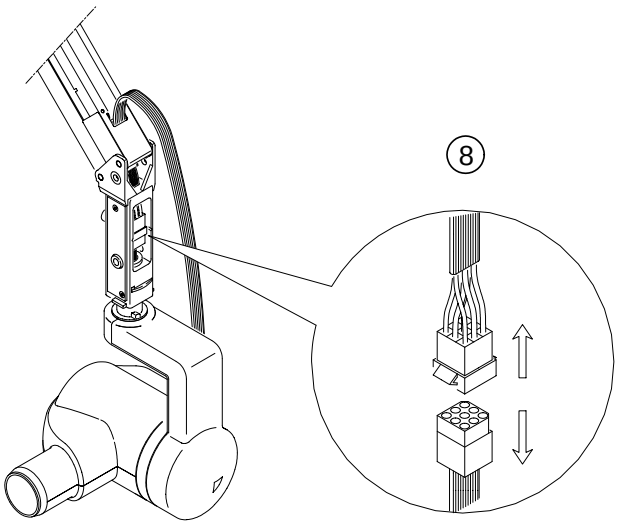


7 - Remove the 4 cable-clamps from the scissor arm, punching out the pins with a 2 mm pin punch.

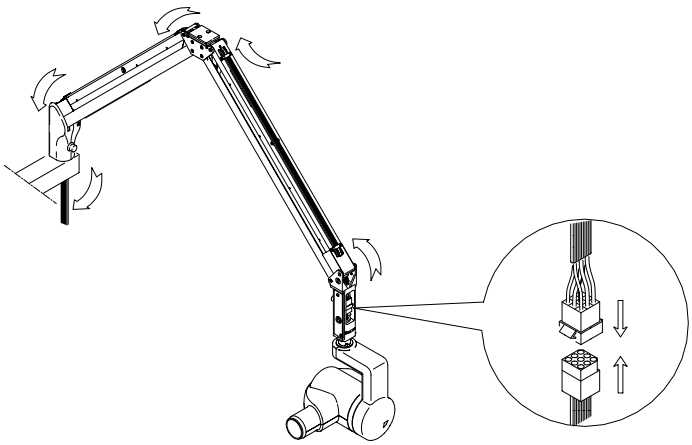
Note: the pins will fall inside the arm. Make sure you get them in order to replace the cable clamps.



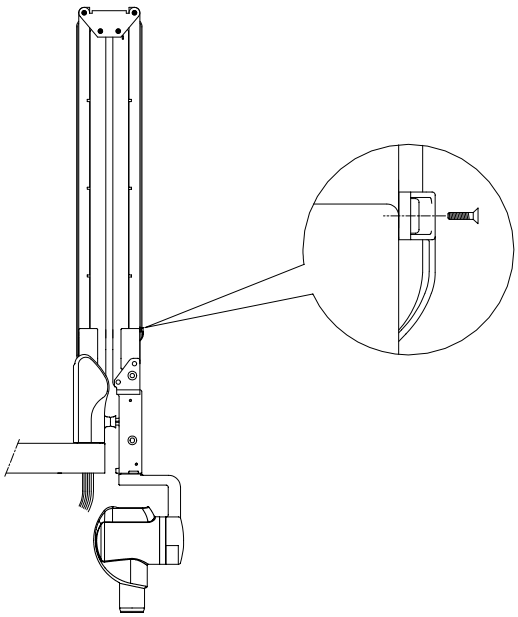
8 - Take out the cable, working toward the generator.
Disconnect the generator plug and remove the cable by pulling the connector.
Recover the cable-clamp pins.



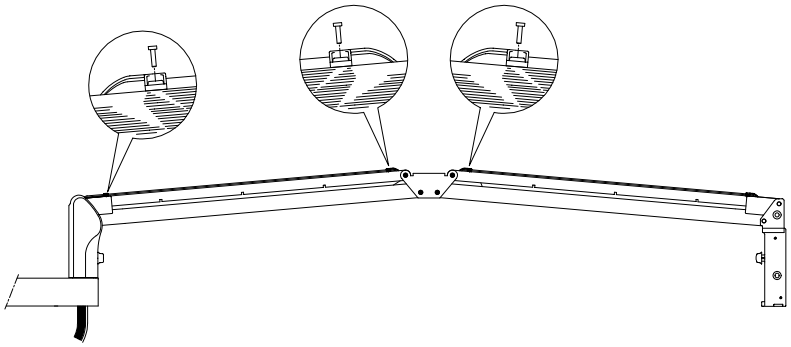
9 - Take the new cable. Feed it through the top opening of the generator support.
Be careful which way the connectors are positioned. The cable must not be twisted during installation. You must therefore check the position of the generator connector.
It is possible to place the scissor arm horizontally to facilitate the installation of the cable.
Connect the cable to the generator connector.



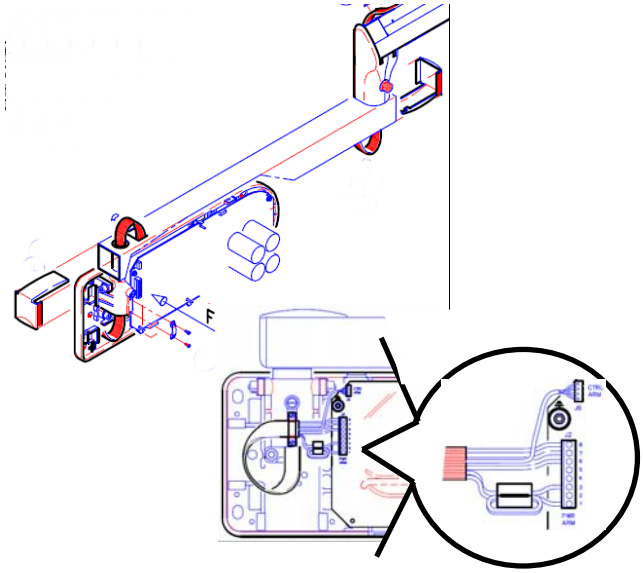
10 - Place the scissor arm in a vertical position.
Place the bottom cable-clamp, on the generator side, using 2 pins.



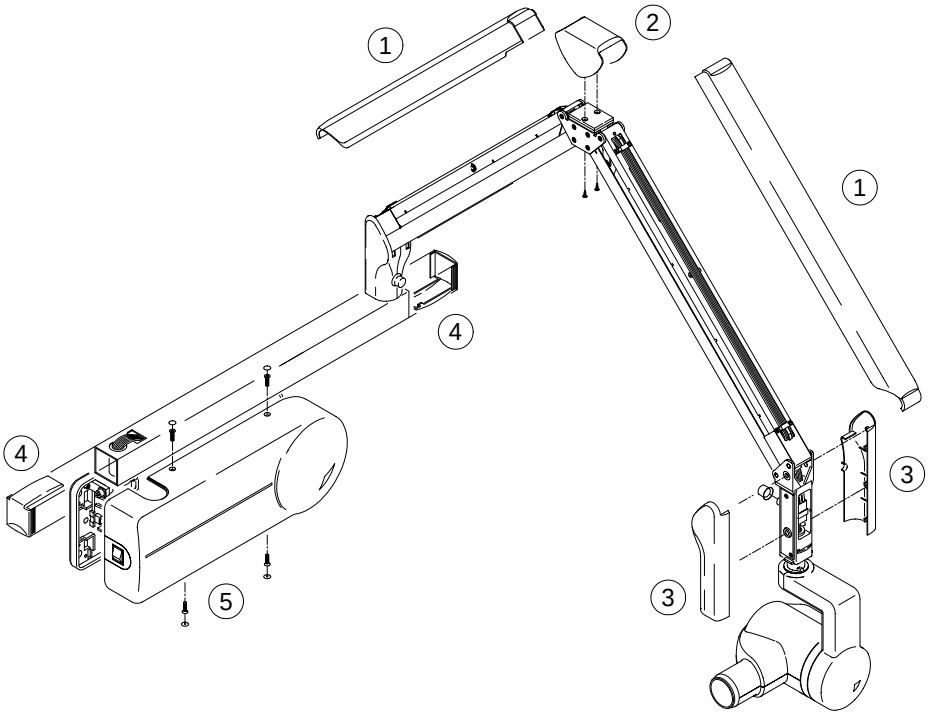
Extend the arm horizontally.
Place the other 3 cable-clamps with 2 pins each.
The cable must not be slack, but it must not be taut either.



Slip the cables into the extension arm through the corresponding openings.
Feed the cable through the arm's support axis.
Connect the cable to the board's PWR ARM and CTRL ARM connectors. Fix the cable to the arm support using the cable-clamp.
Place the cable in excess in the extension arm.
Test the connection.
Place the arm in different positions to check any stress on the cable.

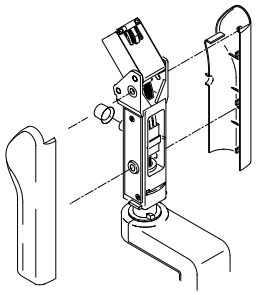


Reassemble the various covers in the order shown in the figure below.



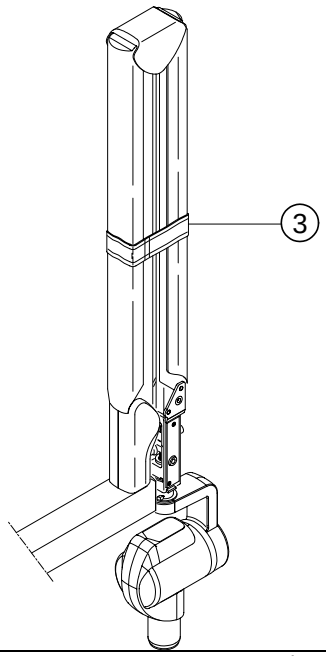
3.2 - Generator replacement

Remove the 2 plastic covers on each side of the arm, as well as the plastic cap.



Place the scissor arm in the vertical position.

Strap the scissor arm so that it does not suddenly spring back when the generator is removed.



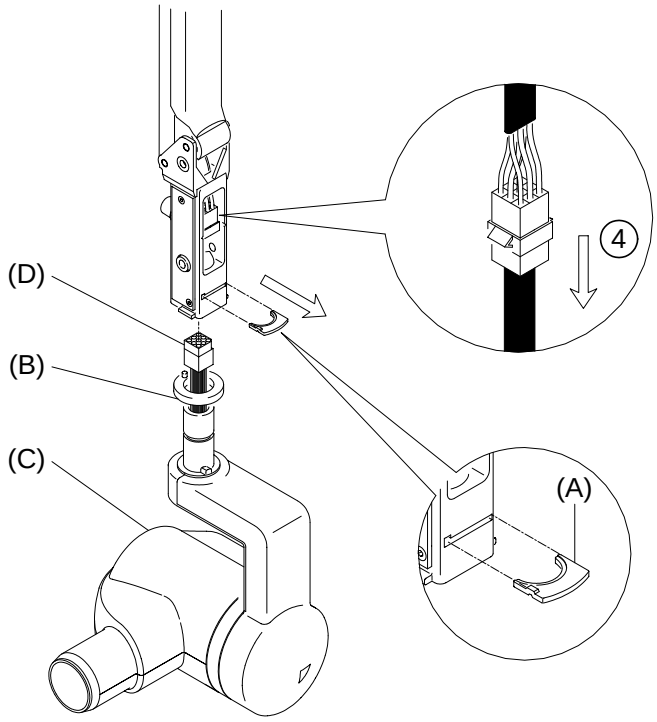
Remove the generator's connector (D) inside the scissor arm.

Hold the generator (C) firmly from underneath.

Remove the key (A) from its slot.

Let the generator down, holding it firmly.

Locate the ring preventing rotation (B).



Take the new generator (C) and install the ring preventing rotation (B).

Carry the generator from underneath with the power plug toward the top (D).

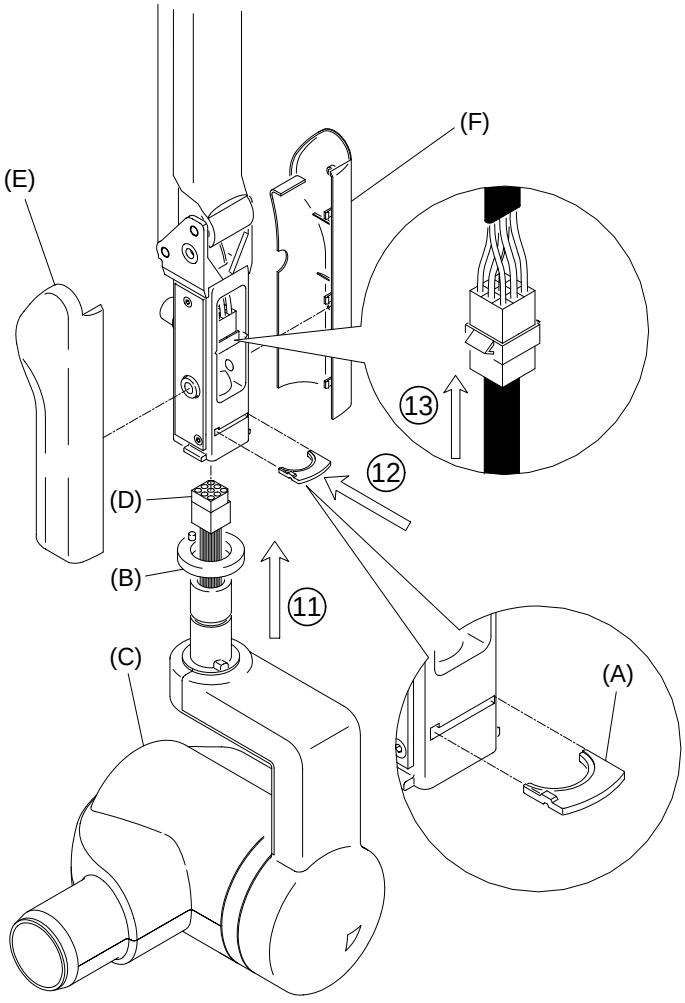
Push upwards until the scissor arm and the generator are in contact.

Keep the generator in this position.
Put the key (A) in its slot.
You can now remove your hand from the generator.

Insert the plug in the socket located inside the scissor arm and push until they lock together.

Install the two plastic covers (E) and (F) on each side of the arm and the plastic cap.
Make sure they are securely in place.

Remove the strap supporting the arm.



3.3 - Arm stability

CAUTION
After a certain amount of time, the arm may become unstable. In this case adjust the spring on the lower arm as described below (for the front arm, refer to Section 3.5 for front jack replacement).

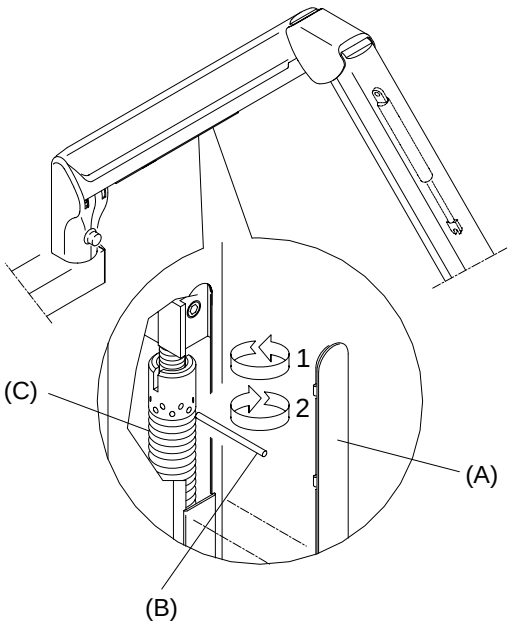
Remove the access plate (A) with a screwdriver.

Use the 4 mm (.16 in.) diameter metal strip (B) supplied with the unit to adjust the spring (C) by turning the nut:

In the direction shown on the drawing if the arm goes down.

In the other direction if the arm goes up.

Replace the access plate (A).

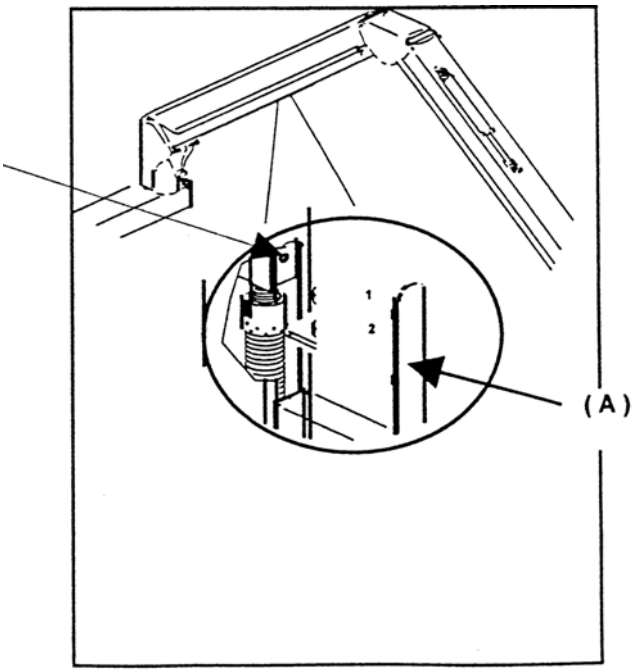


3.4 - Arm flexibility adjustment

Remove the access plate (A) with a screwdriver.

Tighten the set screw to harden the movement. Loosen the screw to smoothen the movement.

Replace the access plate (A).



3.5 - Front jack replacement

Remove the two plastic covers (E).

Place the front arm in a vertical position.

Remove the plastic cover (F) on the front arm using a 4 x 150 (.16 x 5.9 in.) screwdriver.

Remove the access plate (A) using the screwdriver, by pressing on its base, reference P.

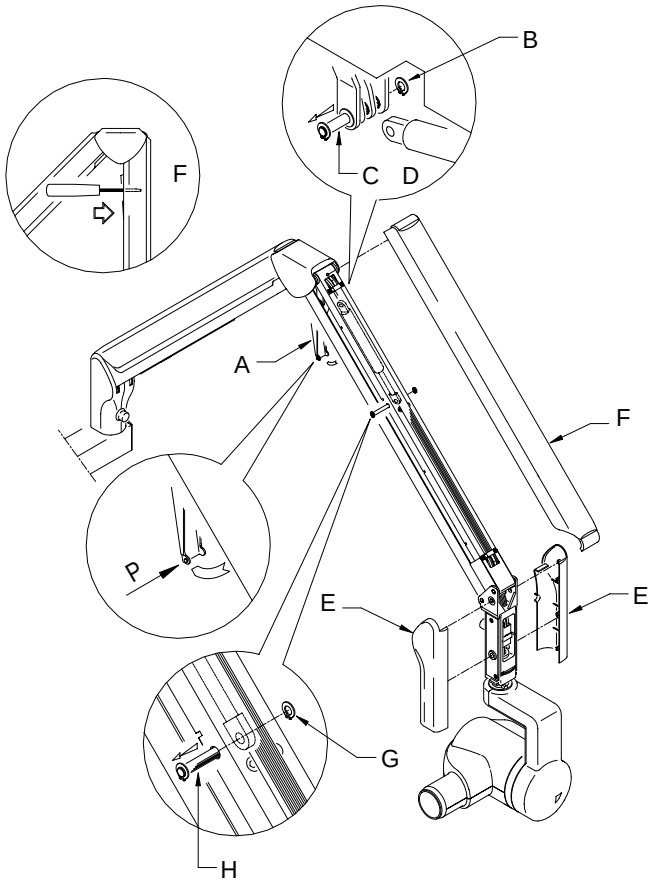
Remove the circlips (B) and (G).

Support the arm. Withdraw axles (H) and (C).

Extract the jack (D).

Take the new jack and insert it rod-end first in the arm opening. Place it in position and reinsert axle (H).

Take axle (C). Place the jack end between the plates. Insert the axle on this assembly.



Place the circlips (B) and (G) back in place.

Replace the access plate (A).

Place the front arm in a vertical position again. Put the cover (F) back in position.

Install the two covers (E) back on the arm’s end and the plastic cap.

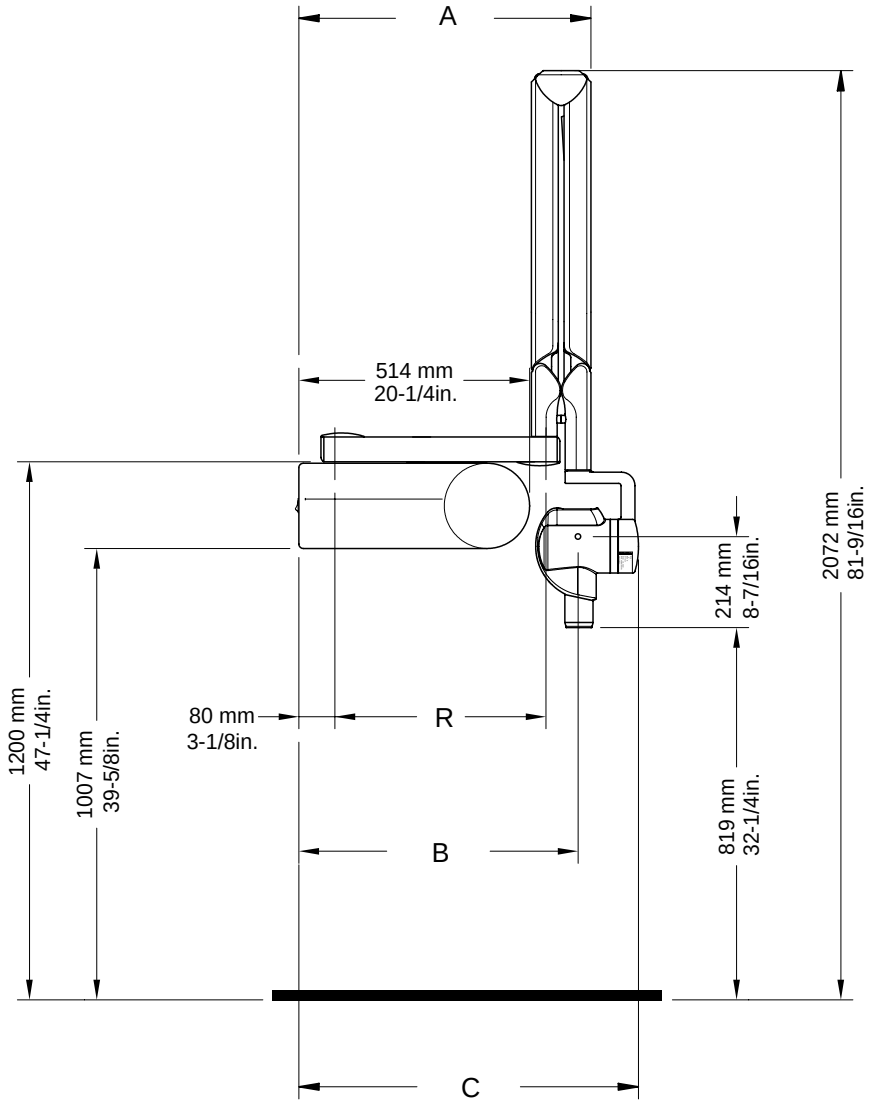
APPENDIX

APPENDIX 1

Dimensional Diagrams

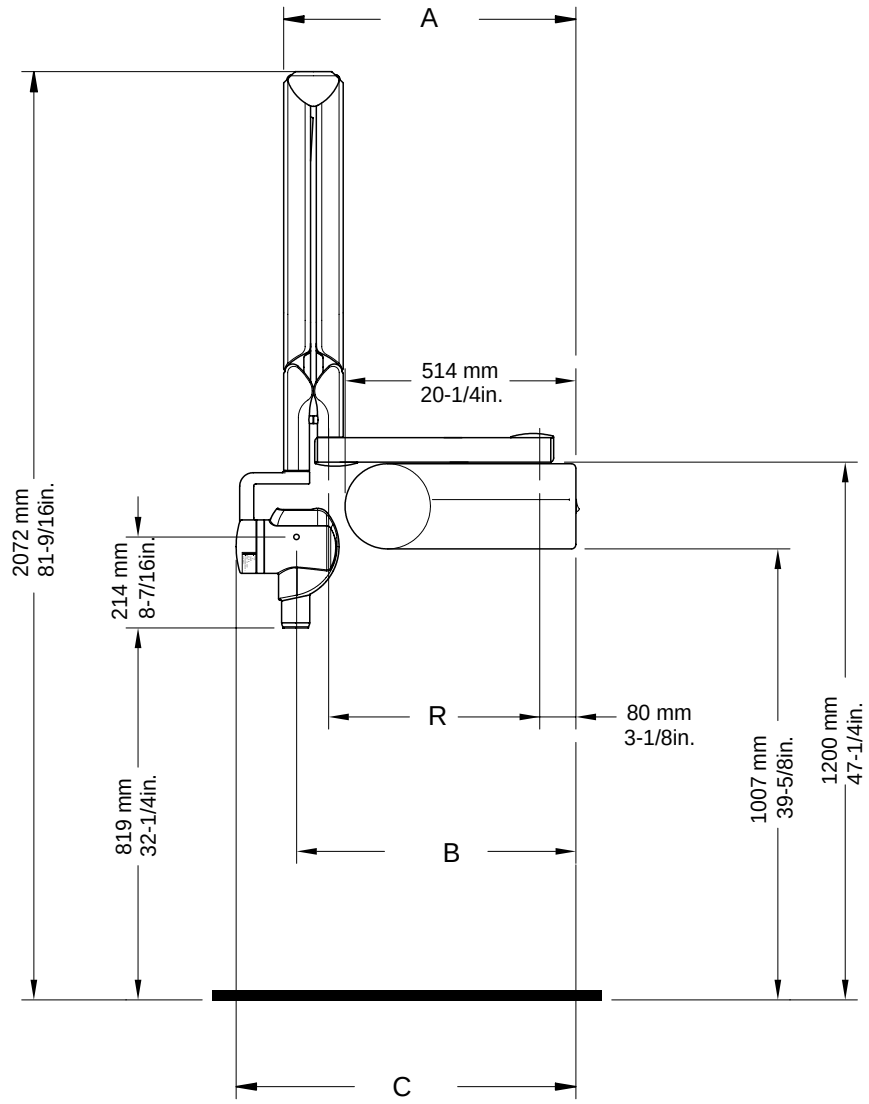
Dimensions

Space requirements - frame oriented to the right



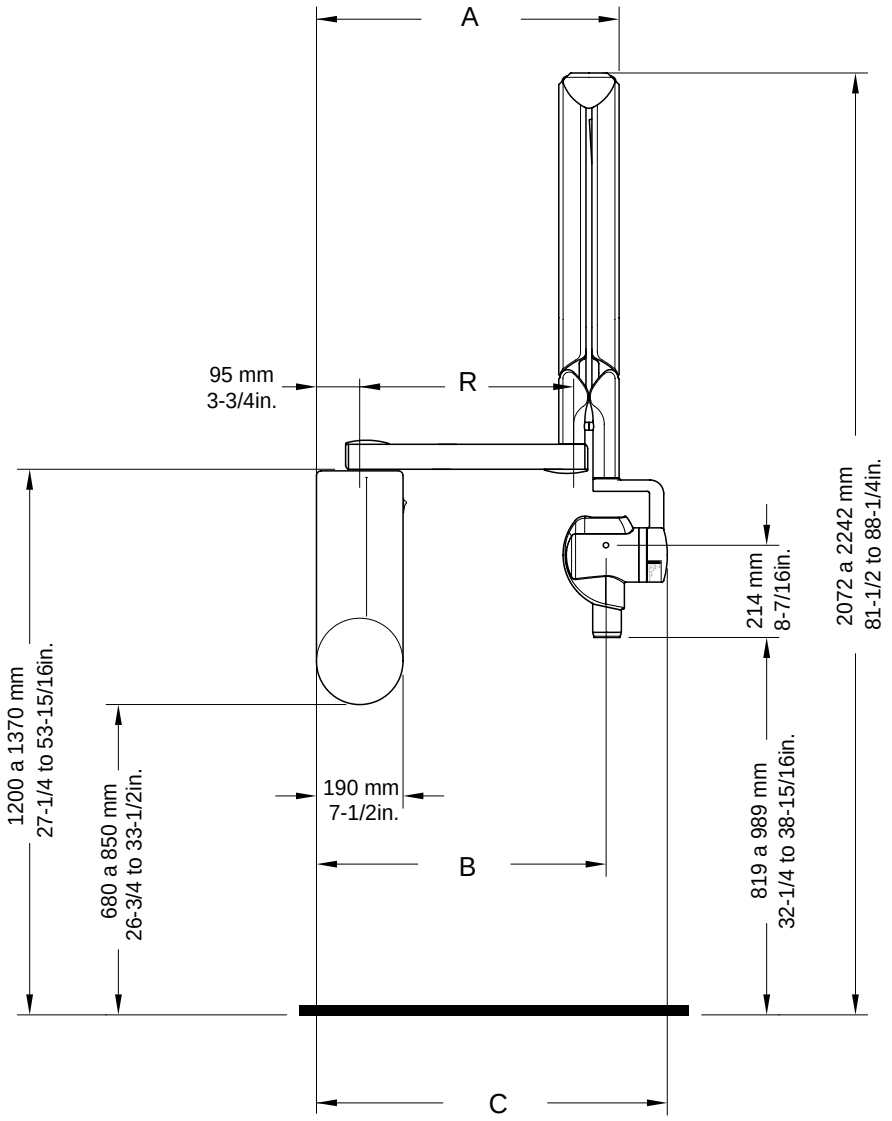
EXTENSION	R	A	B	C
CG645	470 mm (18-1/2 in.)	651 mm (25-5/8 in.)	622 mm (24-1/2 in.)	757 mm (29-13/16 in.)
CG646	648 mm (25-1/2 in.)	829 mm (32-5/8 in.)	800 mm (31-1/2 in.)	935 mm (36-13/16 in.)
CG648	825 mm (32-1/2 in.)	1 006 mm (39-5/8 in.)	977 mm (38-1/2 in.)	1 112 mm (43-3/4 in.)

Space requirements - frame oriented to the left



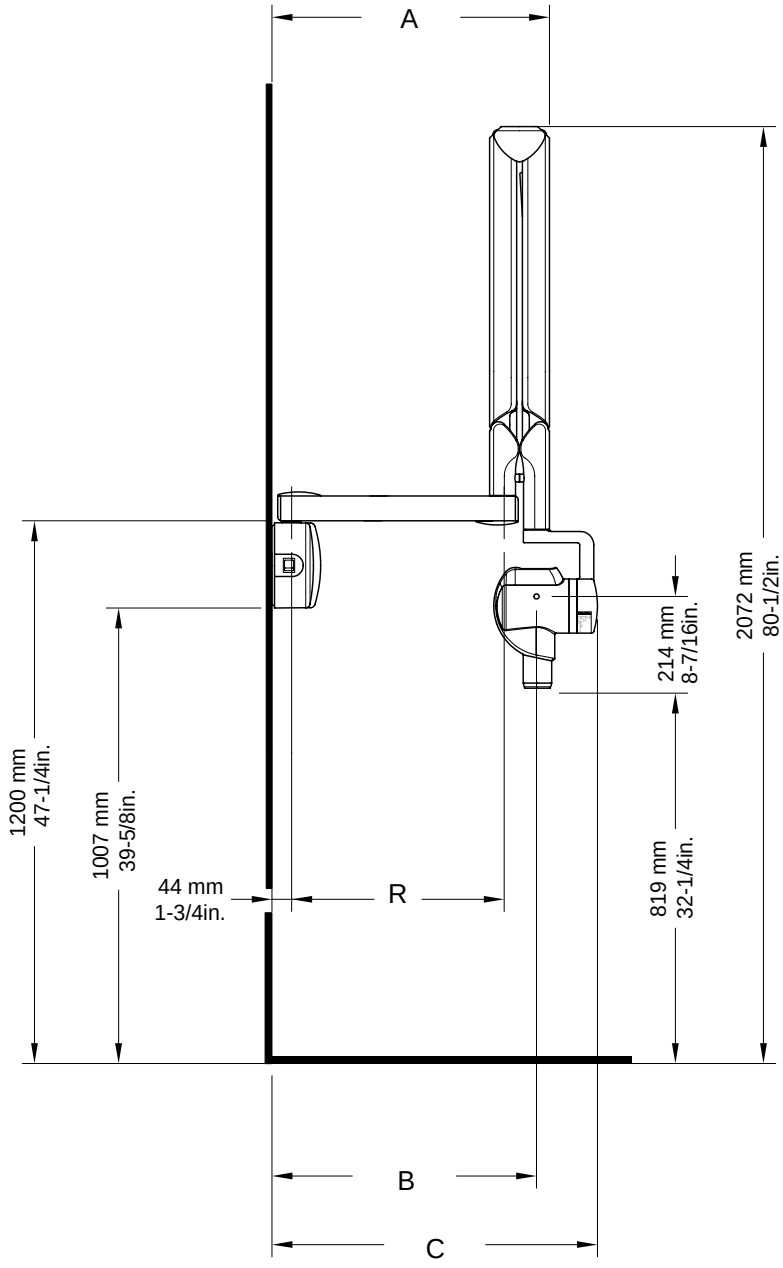
EXTENSION	R	A	B	C
CG645	470 mm (18-1/2 in.)	651 mm (25-5/8 in.)	622 mm (24-1/2 in.)	757 mm (29-13/16 in.)
CG646	648 mm (25-1/2 in.)	829 mm (32-5/8 in.)	800 mm (31-1/2 in.)	935 mm (36-13/16 in.)
CG648	825 mm (32-1/2 in.)	1 006 mm (39-5/8 in.)	977 mm (38-1/2 in.)	1 112 mm (43-3/4 in.)

Space requirements - frame oriented vertically



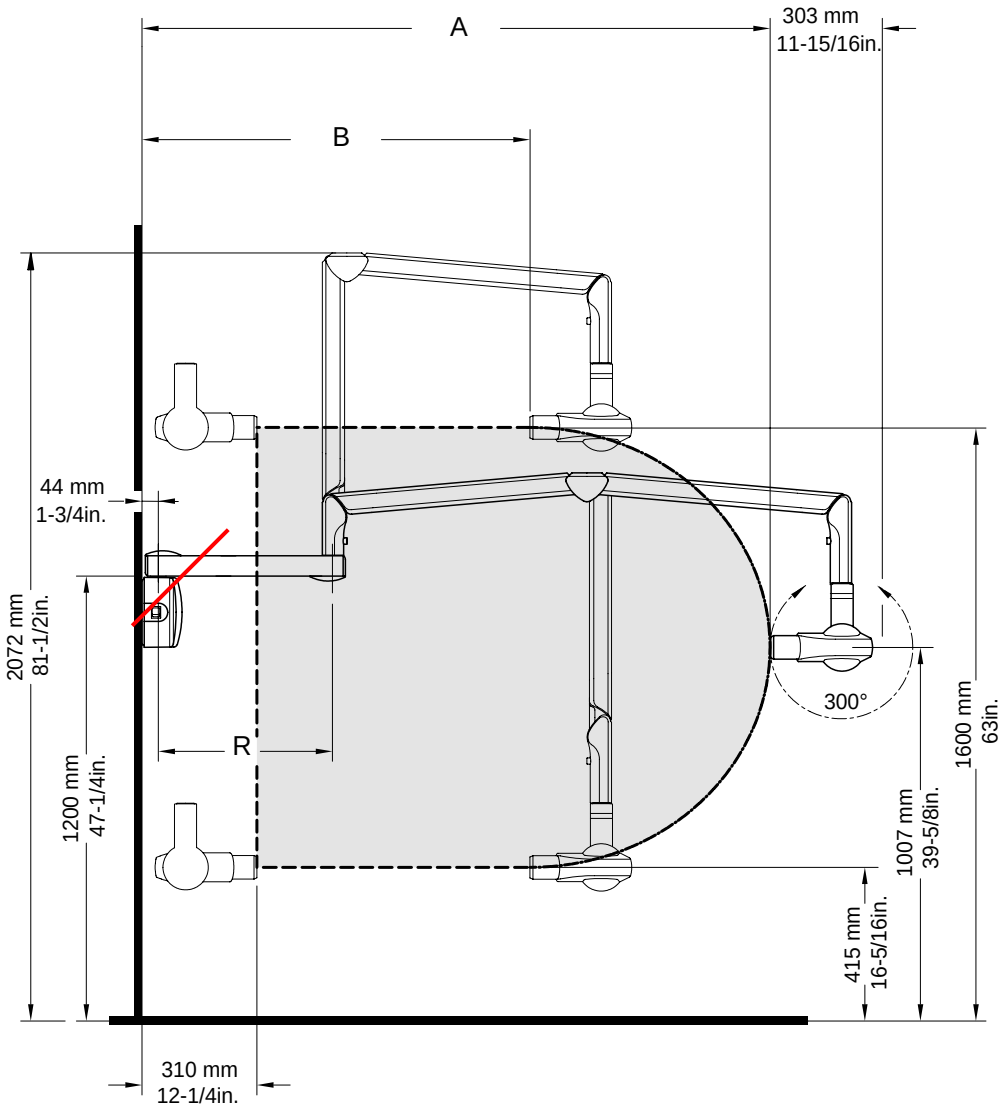
EXTENSION	R	A	B	C
CG645	470 mm (18-1/2 in.)	666 mm (26-1/4 in.)	637 mm (25-1/16 in.)	772 mm (30-3/8 in.)
CG646	648 mm (25-1/2 in.)	844 mm (33-1/4 in.)	815 mm (32-1/16 in.)	950 mm (37-3/8 in.)
CG648	825 mm (32-1/2 in.)	1 021 mm (40-3/16 in.)	992 mm (39-1/16 in.)	1 127 mm (44-3/8 in.)

Space requirements - side view



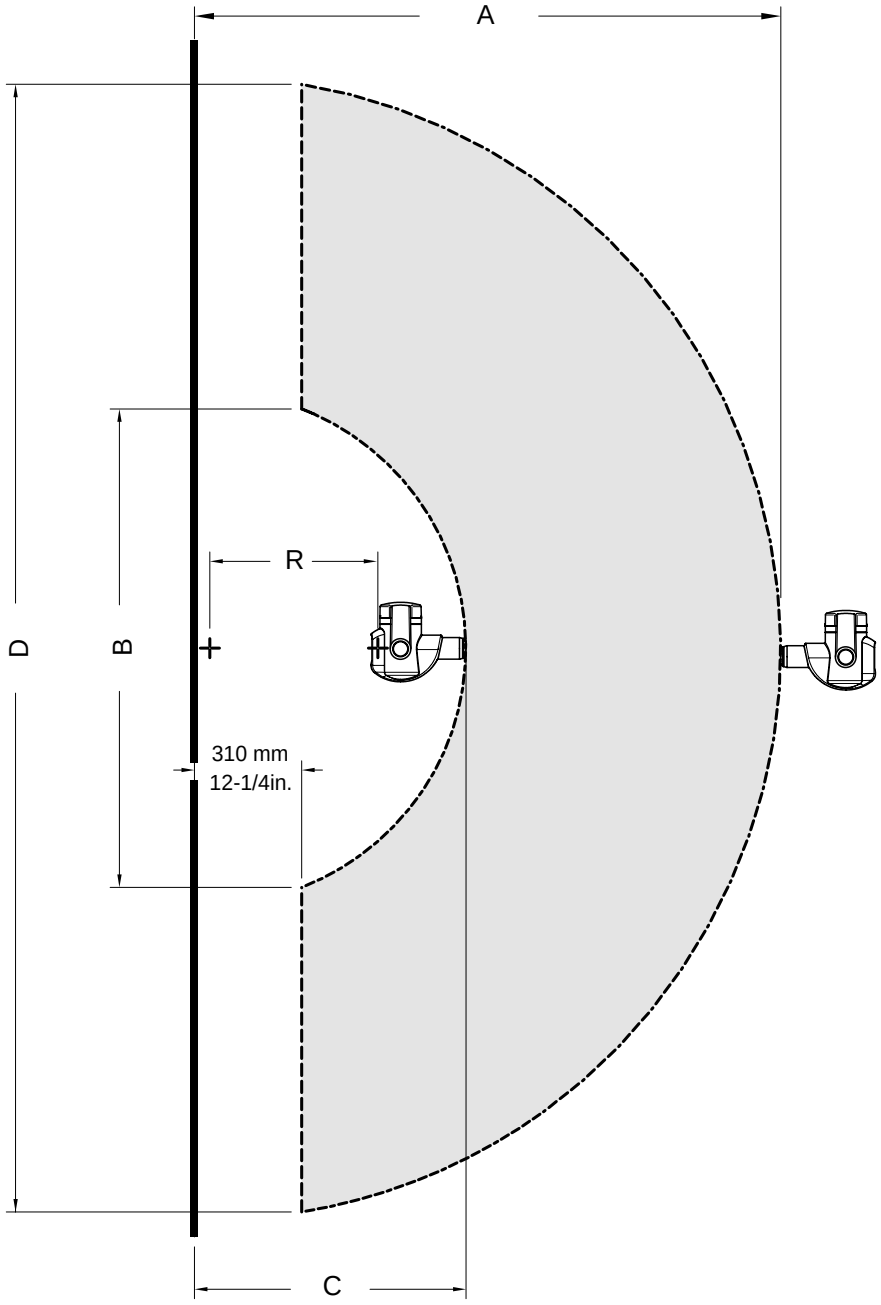
EXTENSION	R	A	B	C
CG645	470 mm (18-1/2 in.)	615 mm (24-1/4 in.)	586 mm (23-1/16 in.)	721 mm (28-3/8 in.)
CG646	648 mm (25-1/2 in.)	793 mm (31-1/4 in.)	764 mm (30-1/16 in.)	899 mm (35-3/8 in.)
CG648	825 mm (32-1/2 in.)	970 mm (38-1/4 in.)	941 mm (37-1/16 in.)	1 076 mm (42-3/8 in.)

Clearance space - side view



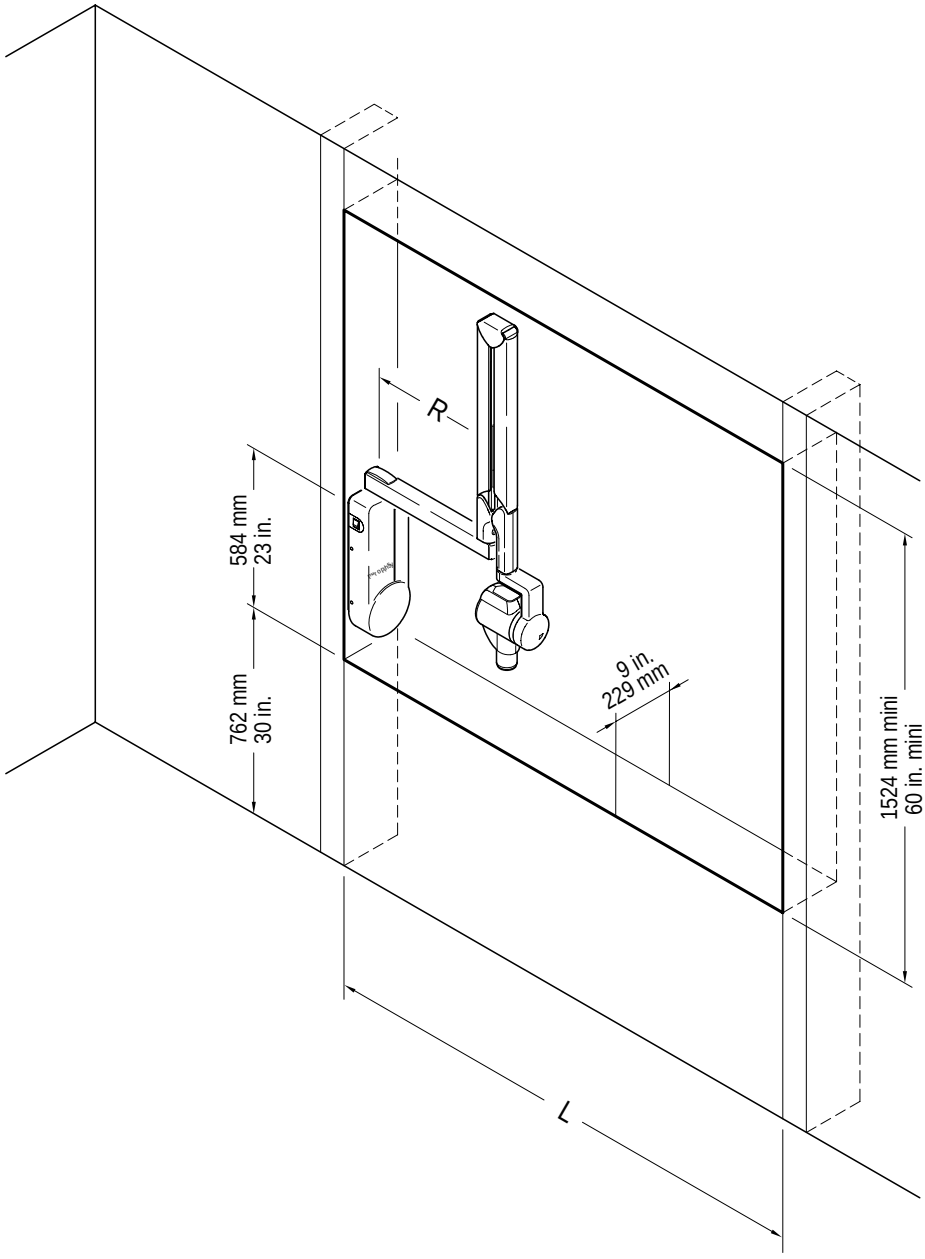
EXTENSION	R	A	B
CG645	470 mm (18-1/2 in.)	1 700 mm (67 in.)	1 047 mm (41-1/4 in.)
CG646	648 mm (25-1/2 in.)	1 880 mm (74 in.)	1 225 mm (48-1/4 in.)
CG648	825 mm (32-1/2 in.)	2 050 mm (80-3/4 in.)	1 402 mm (55-1/4 in.)

Clearance space - bottom view



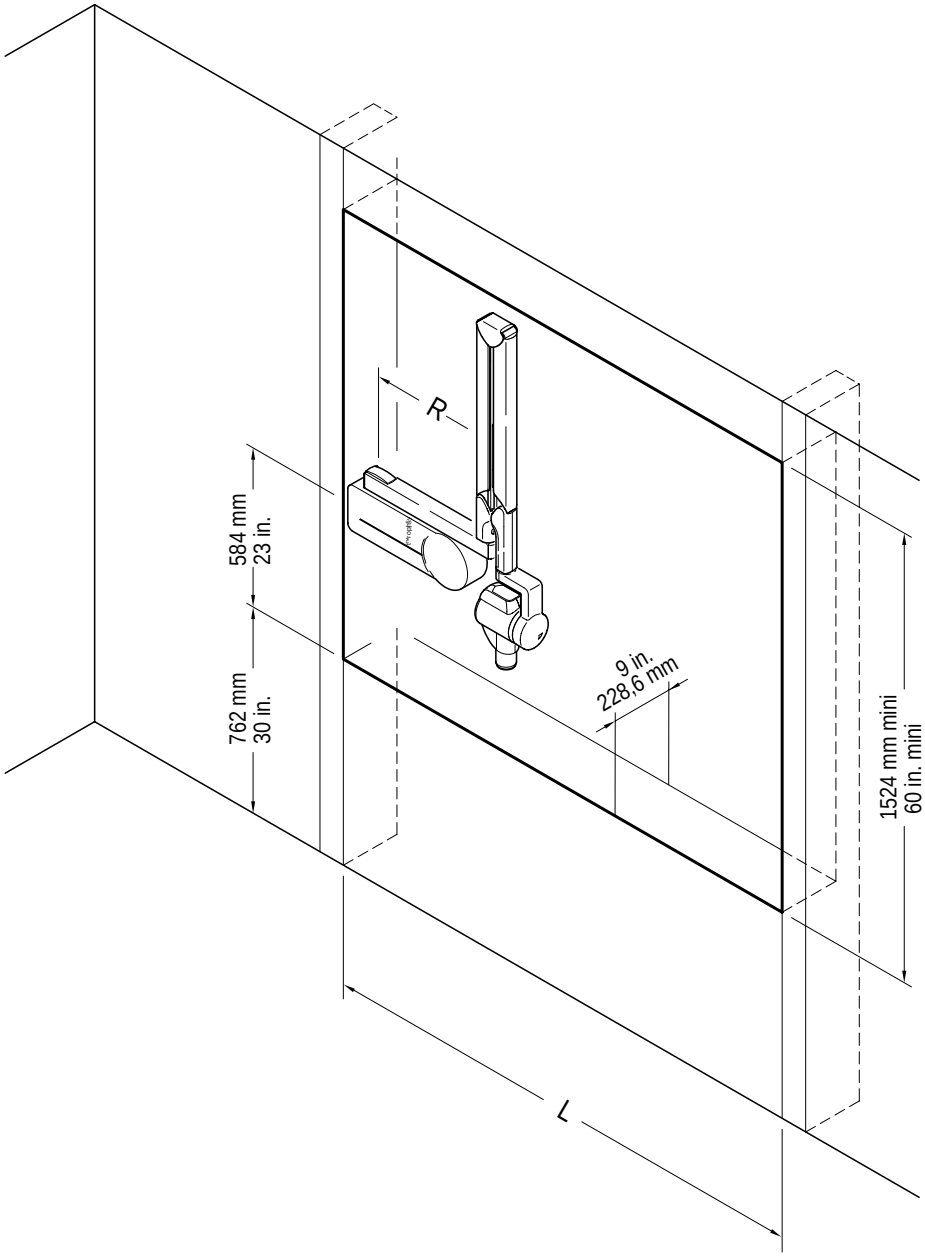
EXTENSION	R	A	B	C	D
CG645	470 mm (18-1/2 in.)	1 700 mm (67 in.)	1 383 mm (54-7/16 in.)	785 mm (30-15/16 in.)	3 257 mm (128-1/4 in.)
CG646	648 mm (25-1/2 in.)	1 880 mm (74 in.)	1 758 mm (69-1/4 in.)	963 mm (37-15/16 in.)	3 617 mm (142-7/16 in.)
CG648	825 mm (32-1/2 in.)	2 050 mm (80-3/4 in.)	2 126 mm (83-11/16 in.)	1 140 mm (44-7/8 in.)	3 975 mm (156-1/2 in.)

Installation for two seats



EXTENSION	R	L
CG645	470 mm (18-1/2 in.)	821 mm (32-5/16 in.)
CG646	648 mm (25-1/2 in.)	1 000 mm (39-3/8 in.)
CG648	825 mm (32-1/2 in.)	1 176 mm (46-5/16 in.)

Installation for pass through (CL045) (for U.S. only)



EXTENSION	R	L
CG645	470 mm (18-1/2 in.)	821 mm (32-5/16 in.)
CG646	648 mm (25-1/2 in.)	1 000 mm (39-3/8 in.)
CG648	825 mm (32-1/2 in.)	1 176 mm (46-5/16 in.)

APPENDIX 2

Technical Specifications

1 - Technical characteristics according to IEC standard 60601-2-7 (2002)

Manufacturer

Kodak -TROPHY
A subsidiary of Eastman Kodak Company
4, rue F. Pelloutier - Croissy-Beaubourg
77437 Marne-la Vallée Cedex 2 (France)

Models

Dental x-ray diagnosis devices, class 1, type B, intermittent use.

The Kodak 2100-TR system is equipped with tube TRX 708 from Kodak-Trophy
The Kodak 2100-C system is equipped with tube OCX / 65-G from CEI

Electric power supply (during exposure)

230 - 240 V AC (± 10%), 50 Hz, 5 A, apparent resistance 0,5 Ω
100 - 110 - 130 V AC (± 10%), 50/60 Hz, 12 A, apparent resistance 0,2 Ω

Electric power supply (in standby)

230 - 240 V AC (± 10%), 50 Hz, 100mA
100 - 110 - 130 V AC (± 10%), 50/60 Hz, 100mA

Rated high voltage and maximum corresponding current

60 kV / 7mA

Current/voltage combinations for a maximum output power of

60 kV / 7 mA

Rated power for exposure time of 0.1 s

420 W

Rate of use

At 60 kV, 7 mA and 0.1 s and at the maximum tank temperature: one exposure every 8 seconds approximately.

Minimum value of the current/time product in the range of conformity

0.07 mAs at 7 mA

Fixed parameters

60 kV / 7 mA

Area of conformity to IEC standard 60601-2-7 (2002)

Reproducibility of the emitted radiation	conform
Linearity of the emitted radiation	conform
Precision in radiography	conform

Measurement conditions

kV: Indirect measurement using a kV-peakmeter.

mAs: direct measurement in the circuit using a mAs-meter.

Exposure time: indirect measurement on the kV signal at 75% of the peak value

Storage and transport conditions

Temperature	: -10°C to 60°C
Relative humidity	: 10% to 95%
Atmospheric pressure	: 700 to 1060 hPa

Dimensions and weight

Component	Dimensions	Weight
Control unit	13 x 9 x 4 cm (6-5/16 x 3-1/2 x 1-9/16 in.)	0.15 kg
Wall framework	51.4 x 18.9 x 10.8 cm (20-1/4 x 7-7/16 x 4-1/4 in.)	4.3 kg
X-ray emitting unit	43.8 x 22.6 x 12 cm (17-1/4 x 8-15/16 x 4-3/4 in.)	4.3 kg
Scissor arm	87.3 x 13.3 x 6.3 cm (34-3/8 x 5-1/4 x 2-1/2 in.)	9 kg

Scissor arm

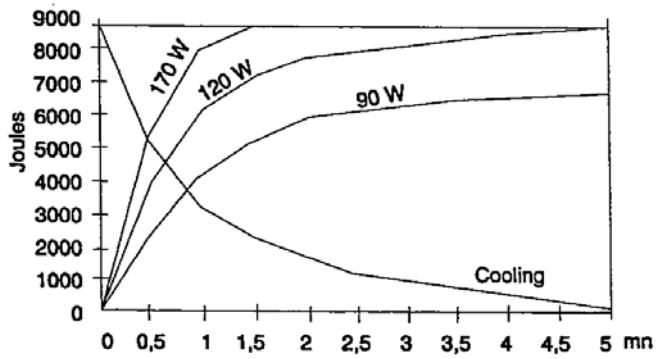
The scissor arm is equipped with one gas jack specially designed for this particular application.
It has been proven to function correctly after more than 400,000 cycles.

Electro-magnetic Compatibility

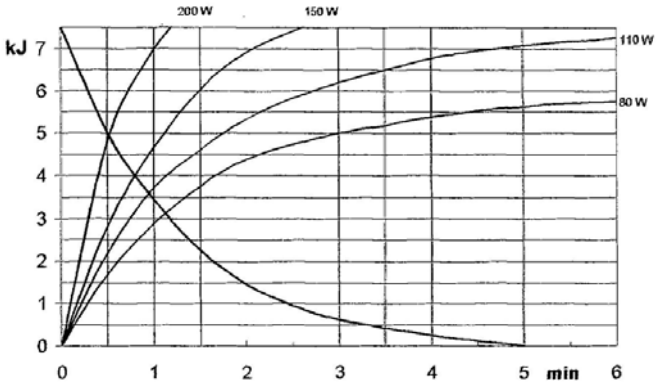
The Kodak 2100 Intraoral X-ray System complies with the European Directive 89/336/EEC and the IEC 60601.1.2 (2001) standard.
Classification: Group 1, Class B

2 - Main characteristics of the x-ray generator

Manufacturer and Type of X-ray Tube	Kodak-Trophy Type TRX 708	CEI Type OCX / 65-G
Rated high voltage	70 kV	70 kV
Rated anodic power	490 W	490 W
Maximum heat accumulated in the anode	8 700 J	10 000 J
Rated value of focal spot (IEC 60336/1993)	0.7 mm (.027")	0.7 mm (.027")
Target materials	Tungsten	Tungsten
Target slope	19°	19°
Filtration due to fixed materials	0.6 mm (.023") eq. Al	0.6 mm (.023") eq. Al



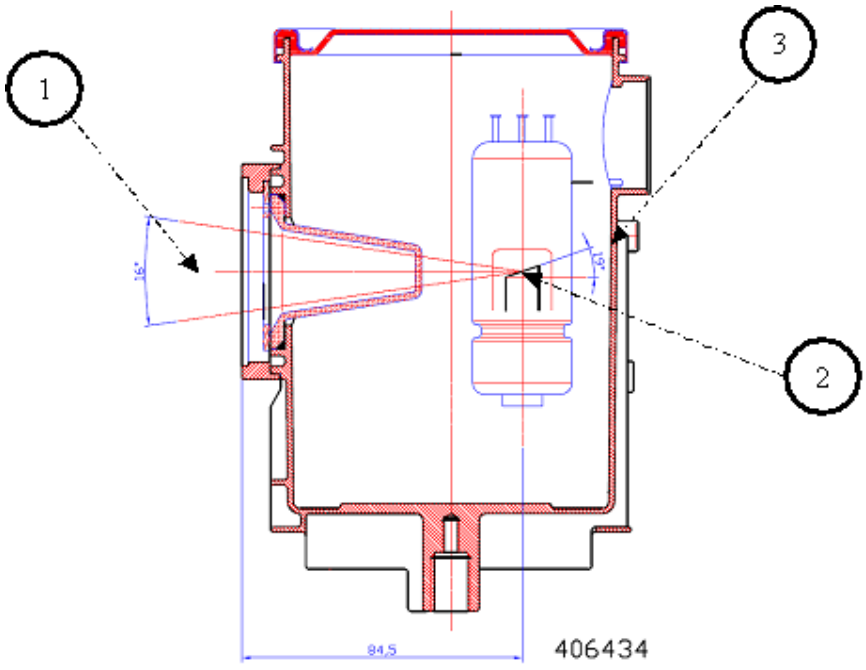
Kodak-Trophy TRX708 tube
Heating and cooling curves



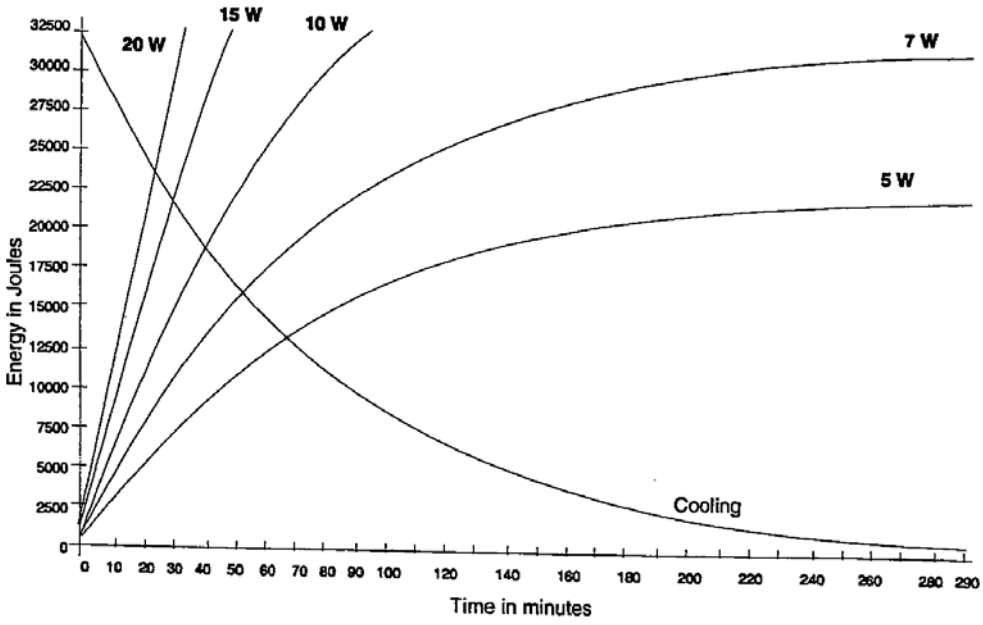
CEI OCX/65-G TUBE
Heating and cooling curves

Equipped x-ray generator

IEC standard 60601-2-28 (1993)	Conform
Type of protection against electric shocks	Class 1
Degree of protection against electric shocks	Type B
Rated value of inherent filtration	1.5 mm (.059") eq. Al
Rated value of additional filtration	1.0 mm (.039") eq. Al
Rated value of total filtration	2.5 mm (.098") eq. Al
Beam limiting cone, focal spot/skin distance	20 cm (7-7/8 in.)
Maximum accumulated heat	32 500 J
Maximum continuous thermal dissipation	7 W
Leaking radiation at maximum rate of use during one hour	< 0,25 mGy
Maximum field of symmetrical radiation	6 cm diameter (2-3/8 in.)
Position and tolerances of the focal spot on the reference axis	0 mm +/- 0.5 mm (0.020")

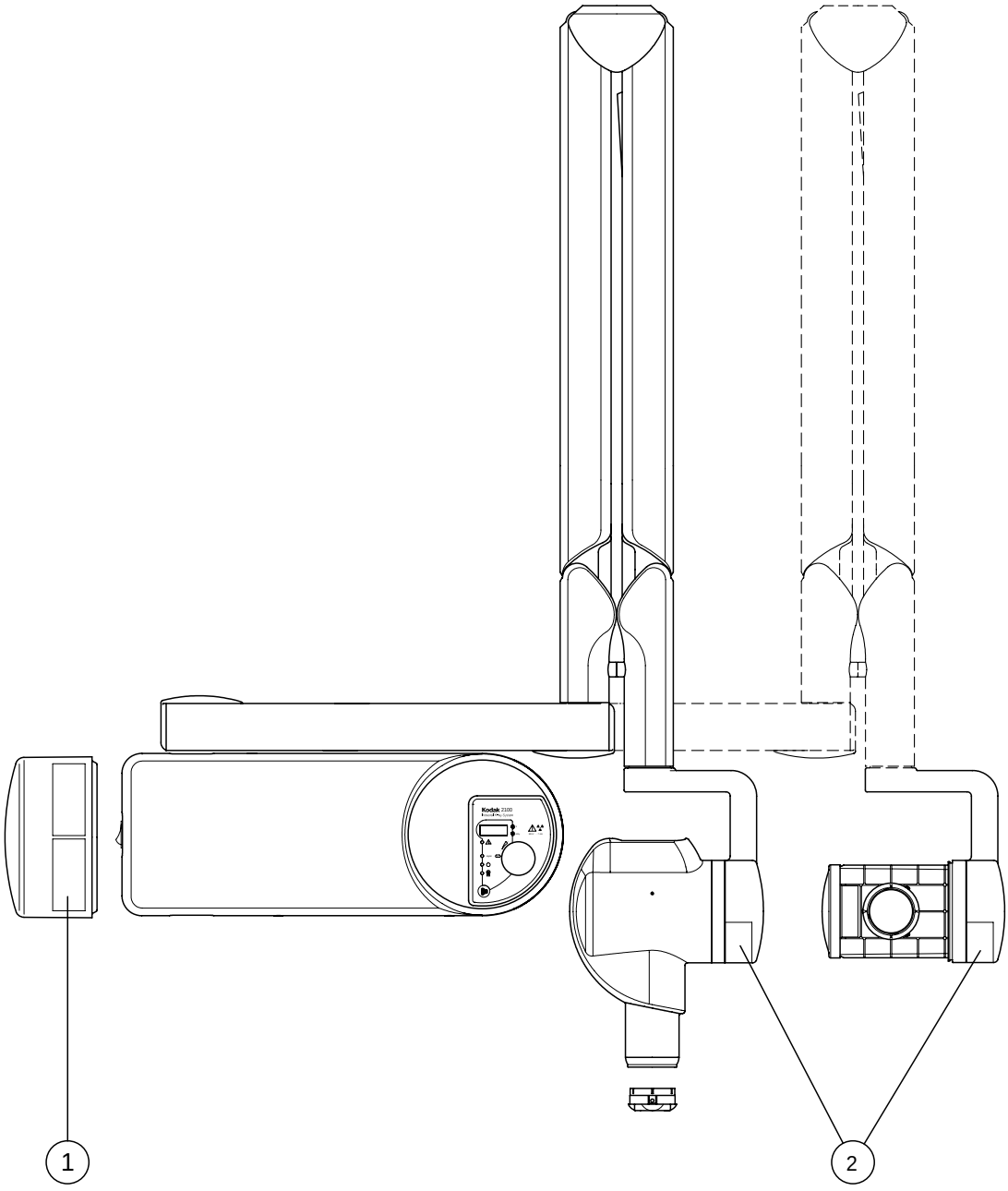


1 Reference axis
2 Focal spot
3 Target angle



Heating and cooling curves of the Kodak 2100 system's tube head

3 - Position of identification labels

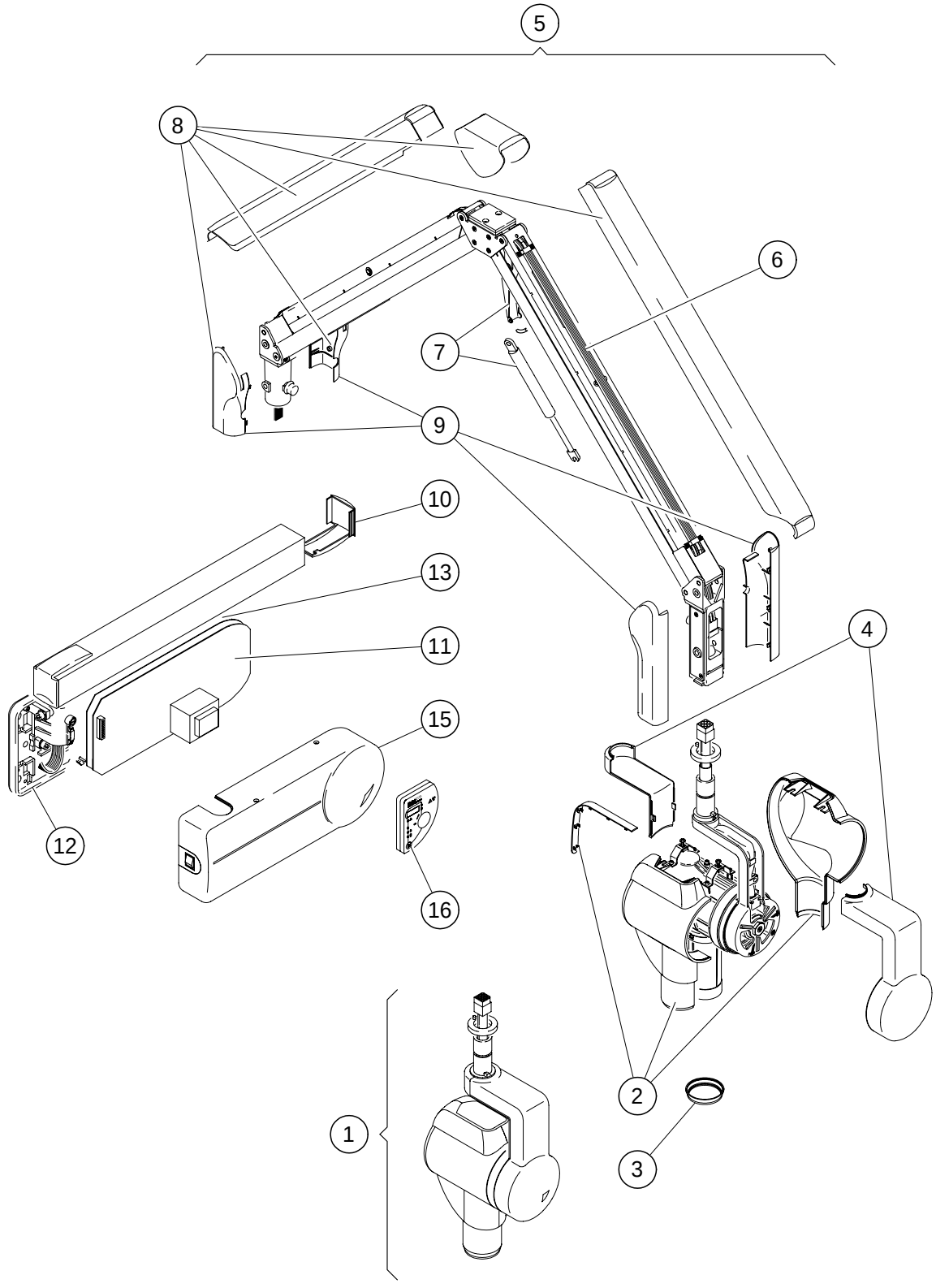


1 Identification of the unit
2 Identification of the x-ray emitting unit

APPENDIX 3

Spare Parts List

DESCRIPTION	REFERENCE	CODE
GENERATOR		
Complete 110 V generator	1	SPK21-1
Complete 230 V generator	1	SPK21-2
K2100 generator cover set	2	SPCSK21
Plastic ring retainer	3	SPHY259
Fork cover set	4	SPCG349
ARM		
Scissor arm	5	SPCG640
Scissor arm for ceiling mount		SPCG692
Scissor arm cable	6	SPCP490
Scissor arm cable for ceiling mount		SPCP478
Arm jack	7	SPJW132
Arm cover set	8	SPCG352
Arm base cover set	9	SPCG353
Extension arm cover set	10	SPHY206
Cover for ceiling mount		SPBY160
Cover for floor mount		SPBY067
WALL FRAMEWORK		
Power board 110V	11	SPJ7181
Power board 220V	11	SPJ7182
Wall apply without power board	12	SPCG795
Plastic insulator	13	SPDE164
On/Off cable for wall framework	14	SPCP489
Wall apply cover	15	SPJR310
CONTROL TIMER		
K2100 control timer	16	SPCG789
CABLES		
Timer (on wall frame) cable		SPCP915
MISC.		
Screw set		SPSSK2K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Eastman Kodak Company
343 State Street
Rochester, NY 14650, USA

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